SANS DIGITAL

MOBILENAS MN4L+(B)

DETAILED USER'S MANUAL v1.0

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MN4L+ License Key - Entry for Web Admin Access

Upon fresh installation or change of NIC chip on the system requires new License Key entry for web admin access.

In order to obtain the CD Key, please contact Sans Digital with the MAC address of eth0.

MAC address of eth0 can be obtained by logging into the command line or by using the NAS-Finder utility. Access to command line can be done by console connection to COM1 of the NAS (bit rate: 9600, flow control: Hardware) or, by directly connecting the keyboard and monitor to the NAS.

For login details, please refer to "MN4L+ Log In", in this manual.

Upon login, type "ifconfig" at the prompt and MAC address for eth0 can be obtained.

MN4L+ Log-In – Web Admin and Command Line

MN4L+ log-in via. Web admin

From internet explorer, such as IE 5.0 (and above) or Mozilla Firefox, type in the IP address of the NAS. Both http and https is supported. Web admin log in page will come up, input as follows and select "enter":

User ID: root
Password: 0000

Java runtime need to be installed on the system using the Web Admin.
The Java runtime is located in the Manual CD.

NOTE: If above password is not accepted, please contact Sans Digital for the password.

MN4L+ log-in via. Command line

Access to command line can be done by directly connecting the keyboard and monitor to the NAS.

To log-in steps from the command line:

Step 1:

Log in as "admin" by following username and password:

User ID: admin

Password: 111111

Step 2:

At the prompt, change user to super user by typing "**su –**" (note there is a space between "u" and "-")

Step 3:

At the prompt for password, type "**0000**".

This will give you root user access to the NAS. Please note that changing the password for web admin access will also change the password for the super user (username: root).

NOTE: If above password is not accepted, please contact Sans Digital for the support.

Options for web admin access (disable & enable http and telnet)

To disable or enable http, telnet and ssh service, you will need to log in via local log-in. Type the following command to control:

To disable web admin:

```
# mv /etc/xinetd.d/swat /root
# service xinetd restart
```

To enable Web services

```
# mv /root/swat /etc/xinetd.d
# service xinetd restart
```

To Disable telnet

```
# mv /etc/xinetd.d/telnet /root
# service xinetd restart
```

To Disable SSH

```
# service stop sshd
# chkconfig --level 345 sshd off
```

To Enable SSH

```
# chkconfig --level 345 sshd on
# service start sshd
```

Remarks:

If login as "admin" does not give you the access/permission enable or disable services with command line. Alternatively, you can also login as "root". However, it is not recommended due to security issues.

MN4L+ Home - Overview of the NAS Administration

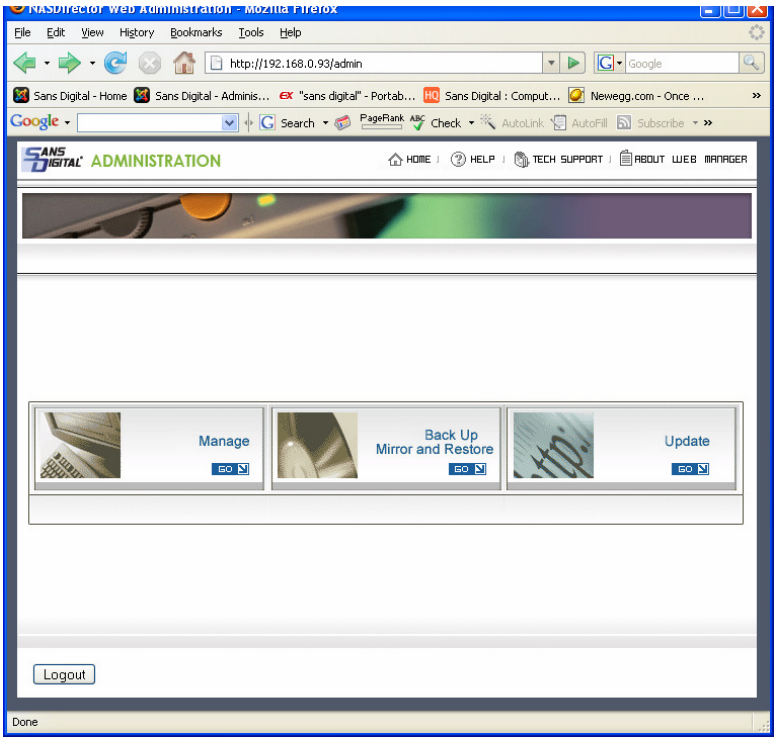
The MN4L+ Administration Home page is accessible from any page within the Web Administration and provides access to the following areas:

MN4L+ - Home

It is the Administration Main Page. It provides the portal entries for 3 major functional groups:

Manage – Manage network setting, volume setting, user account setup and configurations, and MN4L+ server status monitoring
Backup Mirror and Restore – Manage Snapshot & NAS-to-NAS Failover/Mirroring Settings
Update – Update MN4L+ unit with the latest patch. Also for Reboot or input New License Key

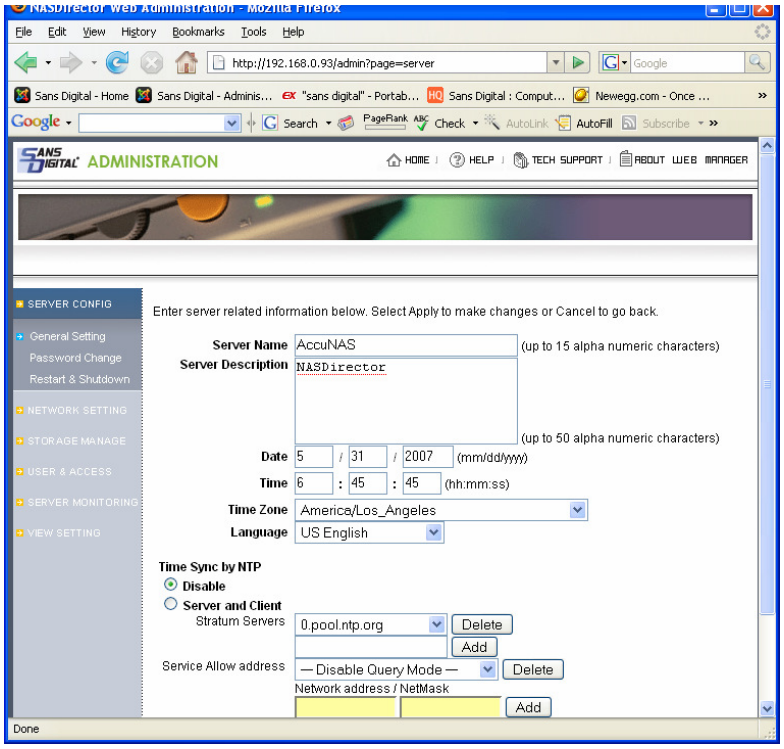
Within any page of any group, clicking the "Administration" logo or "Home" button on the top will always bring you back to this Main page.



MN4L+ - Manage

Enter **MN4L+ Manage** to configure the following:

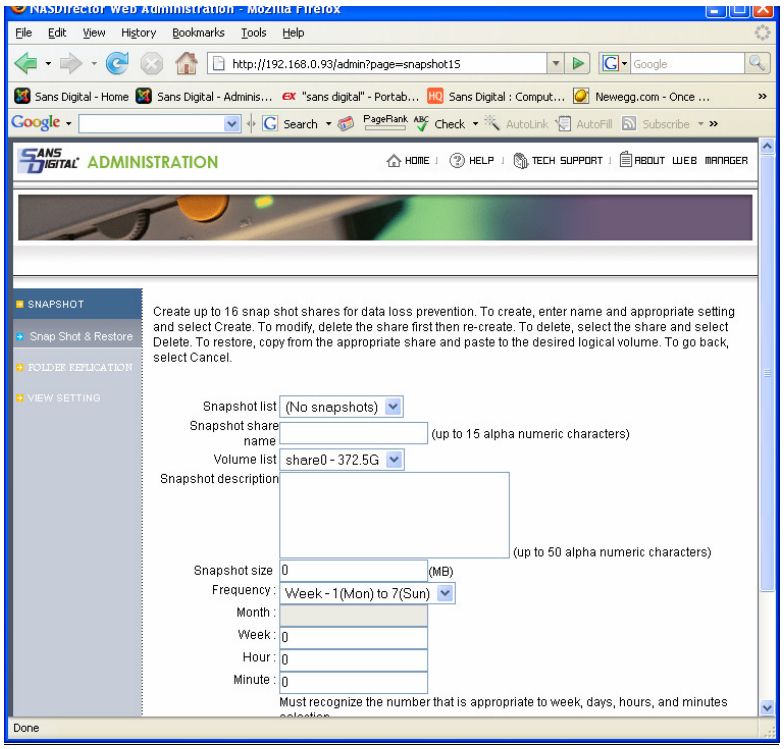
Server Configuration
Network Settings
Storage Management
User & Access
Server Monitoring
View Settings


NASDirector Web Administration - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=server
ADMINISTRATION
HOME | HELP | TECH SUPPORT | ABOUT WEB MANAGER
SERVER CONFIG
General Setting
Password Change
Restart & Shutdown
NETWORK SETTING
STORAGE MANAGE
USER & ACCESS
SERVER MONITORING
VIEW SETTING
Enter server related information below. Select Apply to make changes or Cancel to go back.
Server Name AccuNAS (up to 15 alpha numeric characters)
Server Description NASDirector (up to 50 alpha numeric characters)
Date 5 / 31 / 2007 (mm/dd/yyyy)
Time 6 : 45 : 45 (hh:mm:ss)
Time Zone America/Los_Angeles
Language US English
Time Sync by NTP
Disable
Server and Client
Stratum Servers 0.pool.ntp.org Delete Add
Service Allow address — Disable Query Mode — Delete
Network address / NetMask Add
Done

MN4L+ Back Up, Mirror and Restore

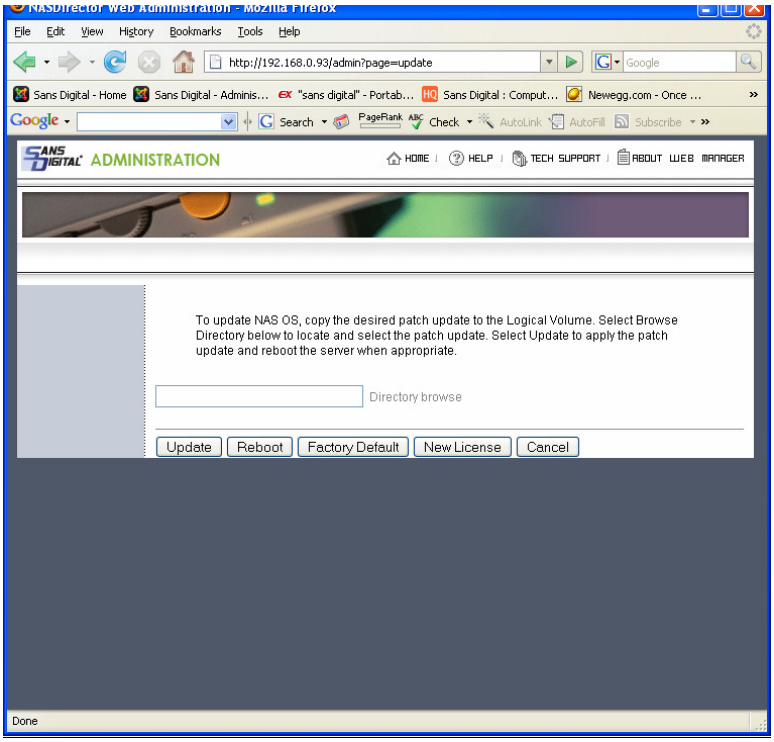
Enter **MN4L+ Back Up, Mirror and Restore** to configure the following:

Snap Shot and Restore
Server Fail over & Mirror
View Settings


NASDirector Web Administration - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=snapshot15
ADMINISTRATION
HOME | HELP | TECH SUPPORT | ABOUT WEB MANAGER
SNAPSHOT
Snap Shot & Restore
FOLDER REPLICATION
VIEW SETTING
Create up to 16 snap shot shares for data loss prevention. To create, enter name and appropriate setting and select Create. To modify, delete the share first then re-create. To delete, select the share and select Delete. To restore, copy from the appropriate share and paste to the desired logical volume. To go back, select Cancel.
Snapshot list (No snapshots)
Snapshot share name (up to 15 alpha numeric characters)
Volume list share0 - 372.5G
Snapshot description (up to 50 alpha numeric characters)
Snapshot size 0 (MB)
Frequency : Week - 1(Mon) to 7(Sun)
Month :
Week : 0
Hour : 0
Minute : 0
Must recognize the number that is appropriate to week, days, hours, and minutes
Done

MN4L+ - Update

Enter **MN4L+ Update** to apply patches and updates for the product.



Server Configuration – General Settings

Enter basic server information here such as server name, date, time and language. MN4L+ records the date and time of events, files and folders based on the system date & time set on this page.

Server Name

Enter a unique name to identify the MN4L+ server. Up to 15 alphanumeric characters (without spaces) are allowed for the server name. By default, it is named: **MN4L+.**

Server Description

Enter a description of up to 50 alphanumeric characters for this MN4L+ to help identifying its use. This is an optional field.

Date

Enter the system date in each appropriate field in the mm/dd/yyyy format. For example, you would enter 04 / 19 / 2002 for April 19, 2002.

Time

Enter the system time in the 24-hour format. Indicate the hour, minutes & seconds in the hh:mm:ss format.

Time Zone

Select the time zone from the drop-down list. The default setting is America/Los_Angeles (US/Pacific Standard Time).

Language

The "Language" is referred to the language used on the client's OS. It will not affect the language use in for the Web Admin GUI. The default language is US English. If you wish to support a different language, select the language from the drop-down list. This multiple language setting allows users to store and retrieve file and directory names that are in the selected language and US English.
Note: You must re-boot the server after changing language to take effect.

Time Sync by NTP

The "Time Sync by NTP" service allows MN4L+ to synchronize the date and time information from the NTP server. It is especially important for Microsoft Domain environment as the connection will be rejected.

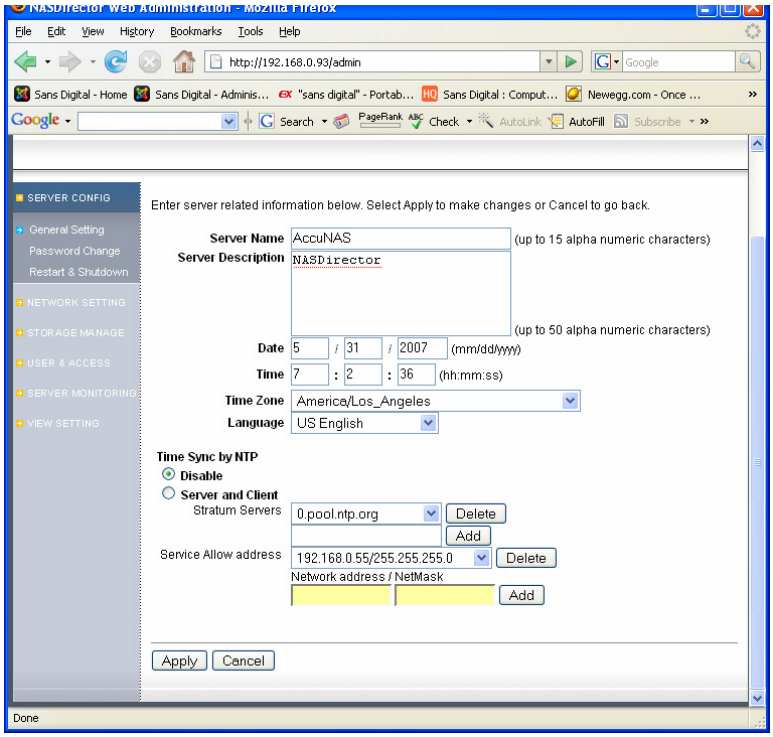
To synchronize with NTP (Network Time Protocol) Server:

1. Select the radio button for **Server and Client**
2. Select the **Stratum Server.** If the server is not in the list, add the name of the server and select **Add.**
3. To delete existing NTP server address, select from the NTP Server List drop down box, select **Delete.**

To provide NTP Sync Service to attached clients:

1. Select the radio button for **Server and Client**
2. Enter the Network Address and Subnet Mask, and click **Add.**

To apply changes, click on **Apply** at the bottom of the screen. To return to the home page, click on **Cancel**.


NASDirector Web Administration - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin
Sans Digital - Home
Sans Digital - Adminis...
"sans digital" - Portab...
Sans Digital : Comput...
Newegg.com - Once ...
Google
Search
PageRank
Check
AutoLink
AutoFill
Subscribe
SERVER CONFIG
General Setting
Password Change
Restart & Shutdown
NETWORK SETTING
STORAGE MANAGE
USER & ACCESS
SERVER MONITORING
VIEW SETTING
Enter server related information below. Select Apply to make changes or Cancel to go back.
Server Name
AccuNAS
(up to 15 alpha numeric characters)
Server Description
NASDirector
(up to 50 alpha numeric characters)
Date
5 / 31 / 2007 (mm/dd/yyyy)
Time
7 : 2 : 36 (hh:mm:ss)
Time Zone
America/Los_Angeles
Language
US English
Time Sync by NTP
Disable
Server and Client
Stratum Servers
0.pool.ntp.org
Delete
Add
Service Allow address
192.168.0.55/255.255.255.0
Delete
Network address / NetMask
Add
Apply
Cancel
Done

Server Config – Password Change

This is a page for changing the password of the user that log-in. To change your log-in password, enter the following information:

Current Password

Enter your current log-in password in this field which appears in asterisks for security purposes. By default, the "root" account's password is: **0000**

New Password

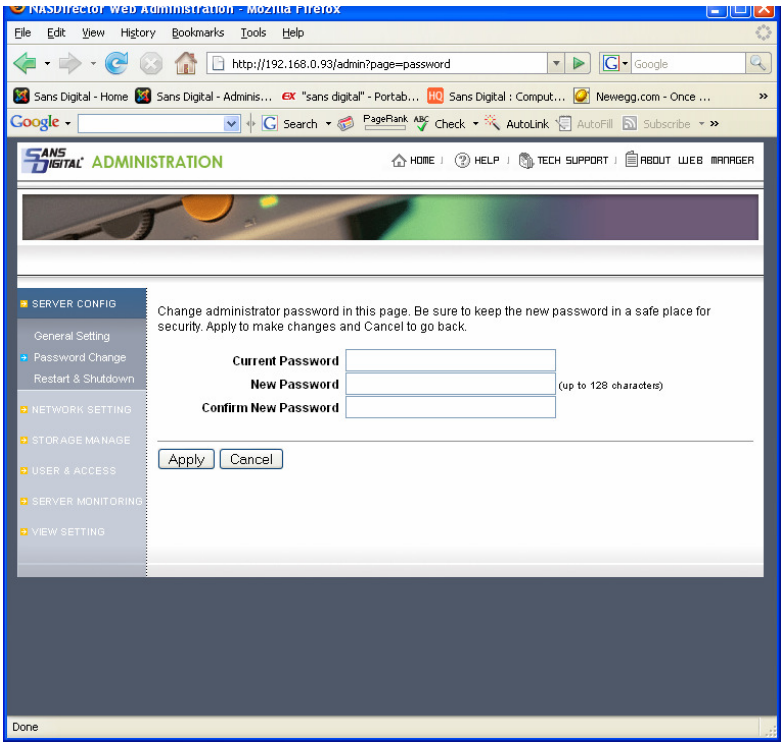
Enter the new password between six(6) to eight(8) alphanumeric characters. Non-alphanumeric characters such as **–) # (** * will not be accepted. The password is case-sensitive and appears in asterisks for security purposes.

Confirm New Password

Re-enter the new password exactly as you entered it in the previous field to verify password accuracy. The password is case-sensitive and appears in asterisks for security purposes.

CAUTION: Be sure to record your password in a safe place. If you have forgotten your password, you are required to re-install the MN4L+ OS and will lose all data and configuration settings.

Once you have entered all the appropriate information, click on **Apply** at the bottom of the page to apply the changes. To exit without applying changes and return to the home page, click on **Cancel**.


NASDirector Web Administration - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=password
ADMINISTRATION
HOME | HELP | TECH SUPPORT | ABOUT WEB MANAGER
SERVER CONFIG
General Setting
Password Change
Restart & Shutdown
NETWORK SETTING
STORAGE MANAGE
USER & ACCESS
SERVER MONITORING
VIEW SETTING
Change administrator password in this page. Be sure to keep the new password in a safe place for security. Apply to make changes and Cancel to go back.
Current Password
New Password
Confirm New Password
(up to 128 characters)
Apply
Cancel
Done

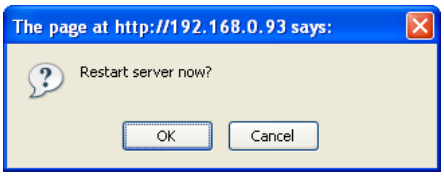
Server Configuration – Restart & Shutdown

This is a page for Restart or Shutdown the MN4L+ unit. It may be necessary to restart MN4L+ after system changes, upgrades, or errors.

NOTE: Notify all logged-in users to log out before beginning MN4L+ to restart or shutdown, or the unsaved data will be lose and result is errors.

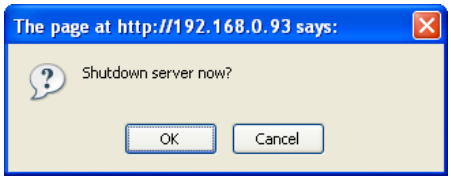
Restart Now

Click on **Restart Now** to immediately shut down and reboot MN4L+. To avoid errors, you will be asked to confirm your request before MN4L+ is restarted.



Shutdown Now

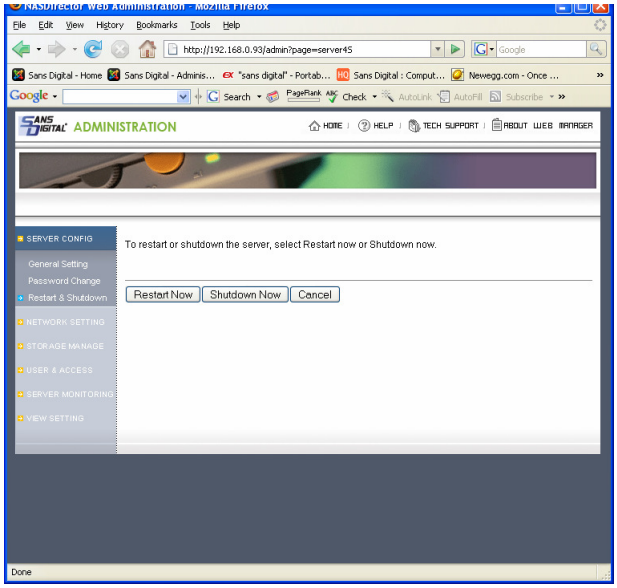
To completely power down MN4L+, click on **Shutdown Now**. The NAS will start its shut down process and turn off. To avoid errors, you will be asked to confirm your request before MN4L+ is Shutdown.



Remark:

- You can also use the NAS-Finder Utility to power off.
- To force a hardware shut down, press the power button for more than four seconds and it will shut down immediately.

To exit without restarting or shutting down the NAS and return to the home page, click on **Cancel**.



Network Settings: TCP/IP Setting for NICs

This is a page for configuring Multiple Gigabit ports for the MN4L+. The MN4L+ is equipped with 2 Gigabit ports. Additional Gigabit ports can be added to increase performance. All of the Gigabit ports are configured in this page.

Assigned Port Pool is a list of the Network Ports assigned with settings. It can be DHCP, SFM or Static.

Port Pool is a list of the Network Ports where the settings have not been assigned and are available to use.

Configuring TCP/IP for the Gigabit Port

Select a desired Gigabit port from **Port Pool** or **Assigned Port Pool**.

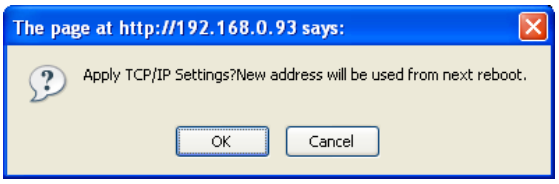
Select **DHCP, SFM and Static**.

- **DHCP** setting allows MN4L+ to receive an IP address from the DHCP sever existing in the network. Normally DHCP IP address is only used for temporary setting to easily configure on network. **For continued use, static IP address is recommended.**
- **SFM (Server Fail-over & Mirror)** is a dedicated port(s) that is used to connect primary and secondary MN4L+ units for heart-beat, data mirroring, and synchronization. This port can be used to transfer data to/from network attached clients, but strongly not suggested to do so. A dedicated port for SFM is preferred.
  Note: To configure SFM port, simply select the available port, click on SFM radio button and click on **Apply**. No TCP/IP information is need for SFM port configuration.
- **Static** IP setting allows MN4L+ to manually set an IP address to fit the existing network setting. You will need to provide a free, unique IP address, Net Mask (Subnet Mask), Broadcast and Default Gateway.

Select **Apply** to confirm the setting or **Cancel** to go back.

Configured port will be listed under **Assigned Port Pool**.

Note: Change or Assign the Network Port setting will required reboot before it take effective.



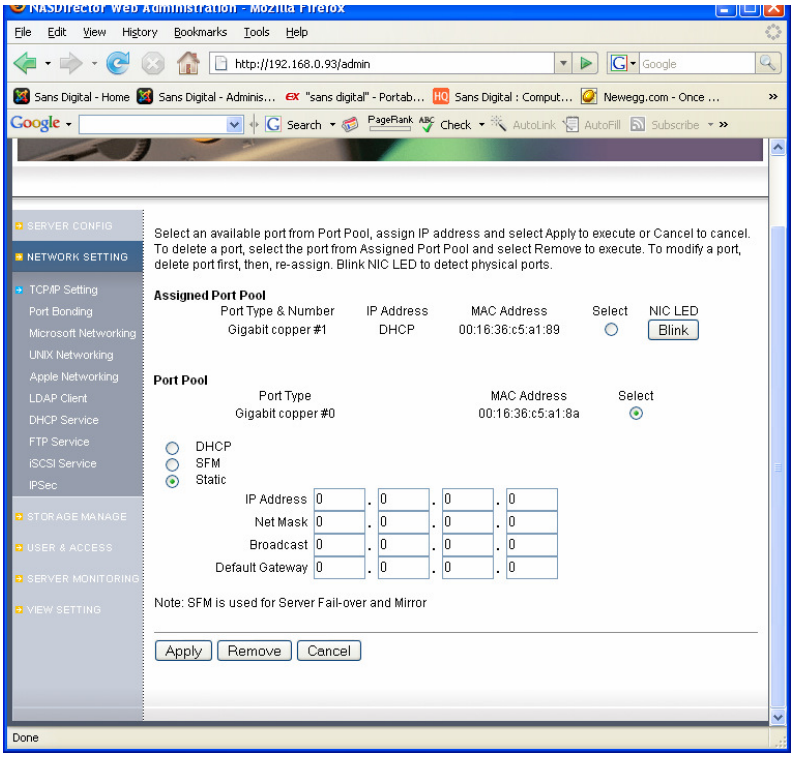
To remove a port from Assigned Port Pool to Port Pool

- Select a desired Gigabit port from **Assigned Port Pool**.
- Select **Remove**.
- Port will be listed under **Port Pool**.

The **blink** feature is provided to identify the physical port. The selected Network Port's LED will start blinking to identify the physical port.

To exit without applying changes and return to the home page, click on **Cancel**.

Remarks: NIC Port #0 in the MN4L+ OS is labeled as NIC Port #1 on the Physical Hardware.


NASDirector Web Administration - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin
Sans Digital - Home
Sans Digital - Adminis...
"sans digital" - Portab...
Sans Digital : Comput...
Newegg.com - Once ...
Google
Search
PageRank
Check
AutoLink
AutoFill
Subscribe
SERVER CONFIG
NETWORK SETTING
TCP/IP Setting
Port Bonding
Microsoft Networking
UNIX Networking
Apple Networking
LDAP Client
DHCP Service
FTP Service
iSCSI Service
IPSec
STORAGE MANAGE
USER & ACCESS
SERVER MONITORING
VIEW SETTING
Select an available port from Port Pool, assign IP address and select Apply to execute or Cancel to cancel. To delete a port, select the port from Assigned Port Pool and select Remove to execute. To modify a port, delete port first, then, re-assign. Blink NIC LED to detect physical ports.
Assigned Port Pool
Port Type & Number
IP Address
MAC Address
Select
NIC LED
Gigabit copper #1
DHCP
00:16:36:c5:a1:89
Blink
Port Pool
Port Type
MAC Address
Select
Gigabit copper #0
00:16:36:c5:a1:8a
DHCP
SFM
Static
IP Address
Net Mask
Broadcast
Default Gateway
Note: SFM is used for Server Fail-over and Mirror
Apply
Remove
Cancel
Done

Network Setting – Port Bonding

Up to 4 Gigabit ports may be bonded using one of seven different bonding methods. Bonded ports provide higher throughput as well as different level of fail-over.

Note: All bonded ports use the IP address and MAC address of the first port in the bond.

Bonded Port Pool lists the current team of bonding. It lists the Team#, IP Address and MAC address.

Unbonded Port Pool lists the available ports for bonding.

To bond ports

- From the **Unbonded Port Pool**, select the desired ports to bond.
- From the **Bond Type**, select the desired bonding method.
- Select **Bond Ports**.
- Ports will now show as a team, under **Bonded Ports Pool**.

NOTE: IP addresses for SFM ports are assigned internally. Therefore, instead of an IP address, you will only see **"SFM"** under IP address section.

To remove bond

- From the **Bonded Ports Pool**, select the bonded team to remove.
- Select **Remove Bond**.

Bonding Type:

1. **Round-Robin**
   Round-Robin policy: Transmit in a sequential order from the first available slave through the last. This mode provides load balancing and fault tolerance.

2. **Active-Backup**
   Active-Backup policy: Only one slave in the bond is active. A different slave becomes active if, and only if, the active slave fails. The bond's MAC address is externally visible on only one port (network adapter) to avoid confusing the switch. This mode provides fault tolerance.

3. **XOR Balancing**
   XOR Balancing policy: Transmit based on an logical formula [(source MAC address XOR destination MAC address) * modula slave count]. This selects the same slave for each destination MAC address. This mode provides load balancing and fault tolerance.

4. **Broadcasting**
   Broadcasting policy: Transmits everything on all slave interfaces. This mode provides fault tolerance.

5. **802.3ad**
   IEEE 802.3ad or Dynamic Link Aggregation: Creates aggregation groups that share the same speed and duplex settings. Transmits and receives on all slaves in the active aggregator. It is also known as "**Trunking**"

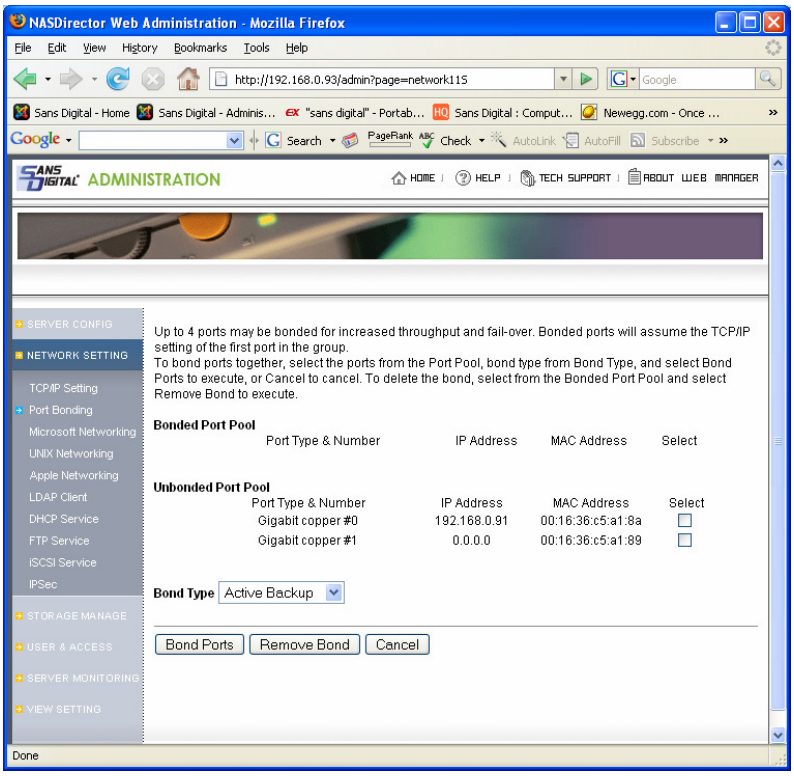
   Conditions: A network switch that supports IEEE 802.3ad Dynamic Link Aggregation / Trunking, and the switch must be configured to enable the "trunking" feature. An 802.3ad capable switch, but without configuring it will not work.

6. **TLB**
   TLB or Adaptive Transmit Load Balancing: Channel bonding that does not require any special switch support. The outgoing traffic is distributed according to the current load (computed relative to the speed) on each slave. Incoming traffic is received by the current slave. If the receiving slave fails, another slave takes over the MAC address of the failed receiving slave.

7. **ALB**
   Adaptive Load Balancing: TLB + Receive Load Balancing (**RLB**) for IPV4 traffic and does not require any special switch support. The receive load balancing is achieved by ARP negotiation. The bonding driver intercepts the ARP Replies sent by the server on their way out and overwrites the source hardware address with the unique hardware address of one of the slaves in the bond such that different clients use different hardware addresses for the server.

Receive traffic from connections created by the server is also balanced. When the server sends an ARP Request the bonding driver copies and saves the client's IP information from the ARP. When the ARP Reply arrives from the client, its hardware address is retrieved and the bonding driver initiates an ARP reply to this client assigning it to one of the slaves in the bond. A problematic outcome of using ARP negotiation for balancing is that each time that an ARP request is broadcasted it uses the hardware address of the bond. Hence, clients learn the hardware address of the bond and the balancing of receive traffic collapses to the current salve. This is handled by sending updates (ARP Replies) to all the clients with their assigned hardware address such that the traffic is redistributed. Receive traffic is also redistributed when a new slave is added to the bond and when an inactive slave is re-activated. The receive load is distributed sequentially (round robin) among the group of highest speed slaves in the bond.

When a link is reconnected or a new slave joins the bond, the receive traffic is redistributed among all active slaves in the bond by initiating ARP Replies with the selected MAC address to each of the clients. The un-delay mode probe parameter must be set to a value equal or greater than the switch's forwarding delay so that the ARP Replies sent to the clients will not be blocked by the switch.



Network Settings - Microsoft Networking

By default, the CIFS/SMB service is enabled and given access to all the MN4L+ logical volumes. If you wish to disable this service and only support other file systems, login to command line and type:

#service smb stop

To join Microsoft Workgroup, Domain, or Active Directory Service, follow the steps below:

Workgroup (for local user):

1. Select **Workgorup** networking radio button
2. Enter Workgroup name in the **Workgroup** or **Domain Name** field

Remarks: When a Windows client does not belong to a Domain or an ActiveDirectory, this client is a local user.

Domain (PDC):

1. Select **Domain** networking radio button
2. Enter the domain **name** in the **Workgroup** or **Domain Name** field. For domain networking, a Primary Domain Controller (PDC) must be available on your network
3. Enter the **name** of the PDC in the **Controller** field
4. Enter account name in the **Account** field and password in the **Password** field

Active Directory Service (ADS):

1. Select **ADS** networking radio button
2. Enter the domain name in the **Workgroup** or **Domain Name** field. For ADS networking, an Active Directory Service (ADS) must be available in your network.
3. Enter the **IP address** of the ADS server in the **Controller** field
4. Enter account name in the **Account** field and password in the **Password** field

To apply changes, click on **Apply** at the bottom of the screen. To exit without applying changes and return to the home page, click on **Cancel**

NOTE-1: Synchronizing with PDC or ADS will place all users and user groups in the PDC, or ADS server into the MN4L+. When access to MN4L+ is attempted by either PDC or ADS users, MN4L+ will communicate with PDC or ADS server to authenticate the user and pass through the proper permission.

NOTE-2: It is either PDC or ADS but not both

NOTE-3: With PDC, it is the **Domain name** to be entered. With ADS, it is the **IP** of the AD Server to be entered.

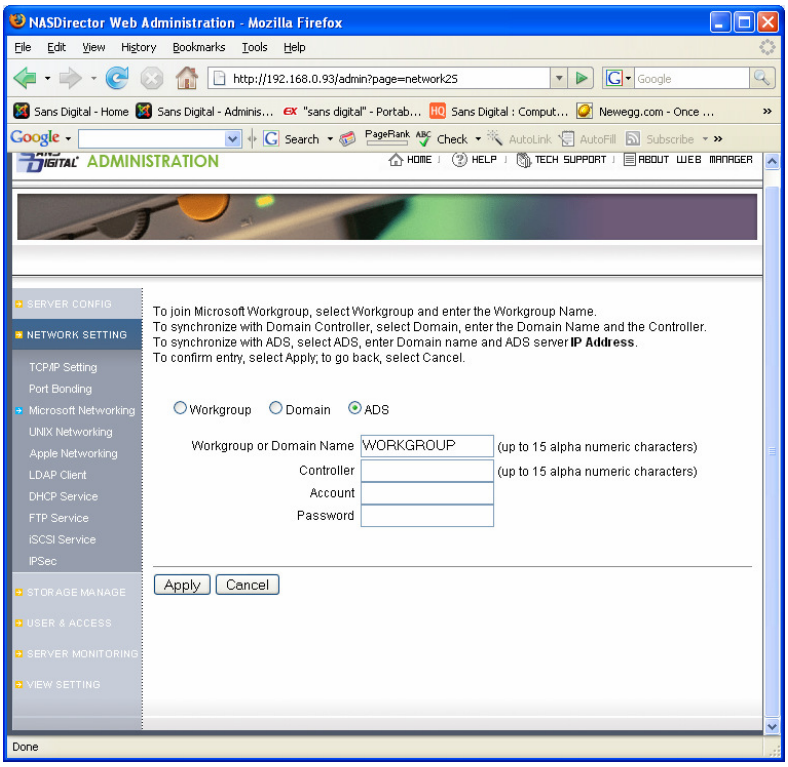
NOTE-4: In the case that synchronization to PDC or ADS fails, reset the MN4L+ account from the PDC or ADS server and retry. Sometimes, resetting the administrator's password also resolves the synchronization problem.

An other possible reason for the failure would be due to system time for MN4L+ and ADS Server are different. Time for MN4L+ and ADS server must be the same down to the minute. If that is not the case, please use the **NTP function** to sync the time between the NAS and the ADS Server.

Lastly, check your input for domain name, server IP address (or name for PDC), UID and password.

NOTE-5: MN4L+ seeks and lists users and groups in the order of **Local**, **LDAP**, **NIS**, and **ADS/PDC**. In the event where you have UID duplicated, above order will be used to list and accept duplicated users and groups.

CAUTION: When using SFM configuration, **ENABLE** ADS synchronization before turning on SFM. If ADS synchronization should require disabling, **DISABLE** SFM before disabling ADS synchronization.


NASDirector Web Administration - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=network2S
Sans Digital - Home
Sans Digital - Adminis...
"sans digital" - Portab...
Sans Digital : Comput...
Newegg.com - Once ...
ADMINISTRATION
HOME
HELP
TECH SUPPORT
ABOUT WEB MANAGER
SERVER CONFIG
NETWORK SETTING
TCP/IP Setting
Port Bonding
Microsoft Networking
UNIX Networking
Apple Networking
LDAP Client
DHCP Service
FTP Service
iSCSI Service
IPSec
STORAGE MANAGE
USER & ACCESS
SERVER MONITORING
VIEW SETTING
To join Microsoft Workgroup, select Workgroup and enter the Workgroup Name.
To synchronize with Domain Controller, select Domain, enter the Domain Name and the Controller.
To synchronize with ADS, select ADS, enter Domain name and ADS server IP Address.
To confirm entry, select Apply; to go back, select Cancel.
Workgroup
Domain
ADS
Workgroup or Domain Name
WORKGROUP
(up to 15 alpha numeric characters)
Controller
(up to 15 alpha numeric characters)
Account
Password
Apply
Cancel
Done

Network Settings - UNIX Networking

In order to allow UNIX clients to access MN4L+ logical volumes, NFS (Network File System) service must be enabled by checking the **Enable NFS service** check box.

Synchronizing with NIS server will place all the users and user groups stored in the NIS server as local users and local user groups into MN4L+. The NAS will communicate with the NIS server to update the user and user group list. In addition, any access attempts made by the NIS users to the NAS logical volume will be authenticated by the UID and password stored in the NIS server.

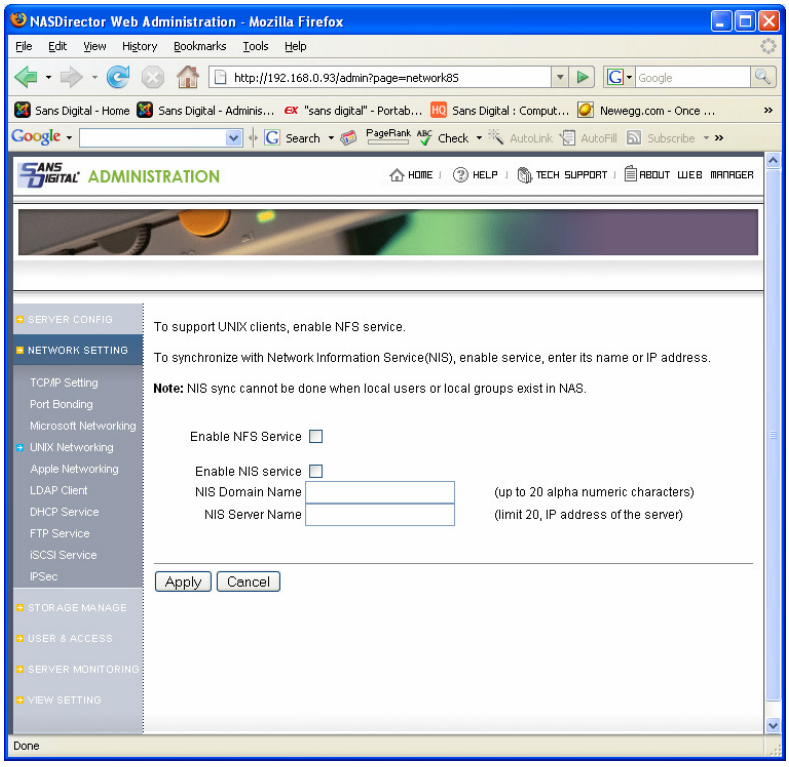
To synchronize with Network Information Service (NIS)

1. Check **Enable NFS service** check box
2. Check **Enable NIS service** check box
3. Enter the domain name in the **NIS Domain Name** field
4. Enter the NIS server name in the **NIS Server Name** field

To apply changes, click on **Apply** at the bottom of the screen. To exit without applying changes and return to the home page, click on **Cancel**.

NOTE: MN4L+ seeks and lists users and groups in the order of **Local**, **LDAP**, **NIS**, and **ADS/PDC**. In the event where you have UID duplicated, above order will be used to list and accept duplicated users and groups.

CAUTION: When using SFM configuration, **ENABLE** NIS synchronization before turning on SFM. If NIS synchronization should require disabling, **DISABLE** SFM before disabling NIS synchronization.



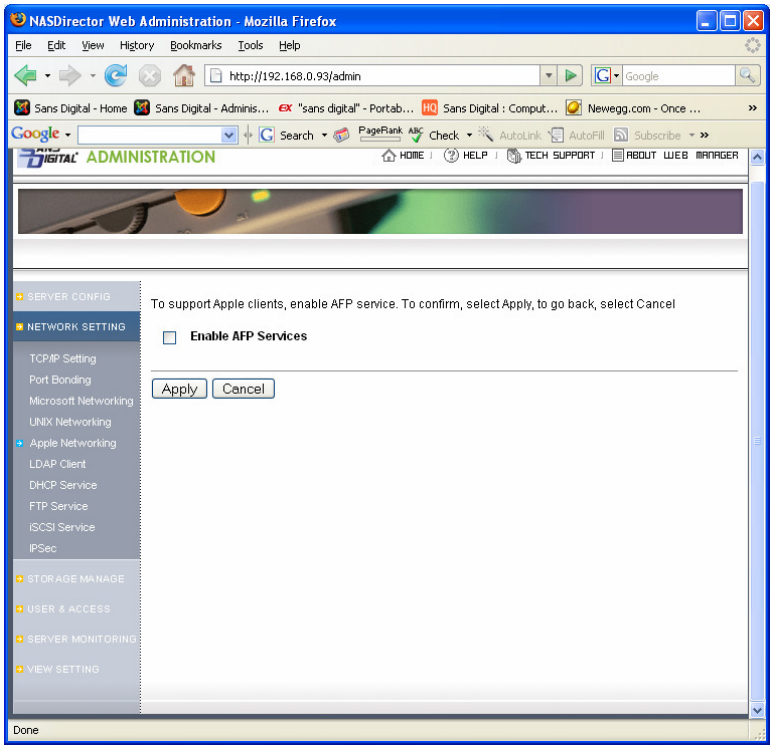
Network Settings - Apple Networking

In order allow Apple clients to access MN4L+ logical volumes, AFP service must be enabled by clicking on the **Enable AFP Service** check box. AFP service will allow NAS local users and user groups and/or NIS users and user groups to access MN4L+ logical volumes.

To apply changes, click on **Apply** at the bottom of the screen. To exit without applying changes and return to the home page, click on **Cancel**.

Note: Mac/Apple client belongs to "local user" (workgroup) category.

Note: Mac/Apple clients can access the NAS shares via SMB/CIFS or AFP protocol. It is your own preference to pick which protocol that works for the best.



Network Setting – LDAP Client

LDAP (Lightweight Directory Access Protocol) is a protocol used to access network directory. MN4L+ supports LDAP v2.2.

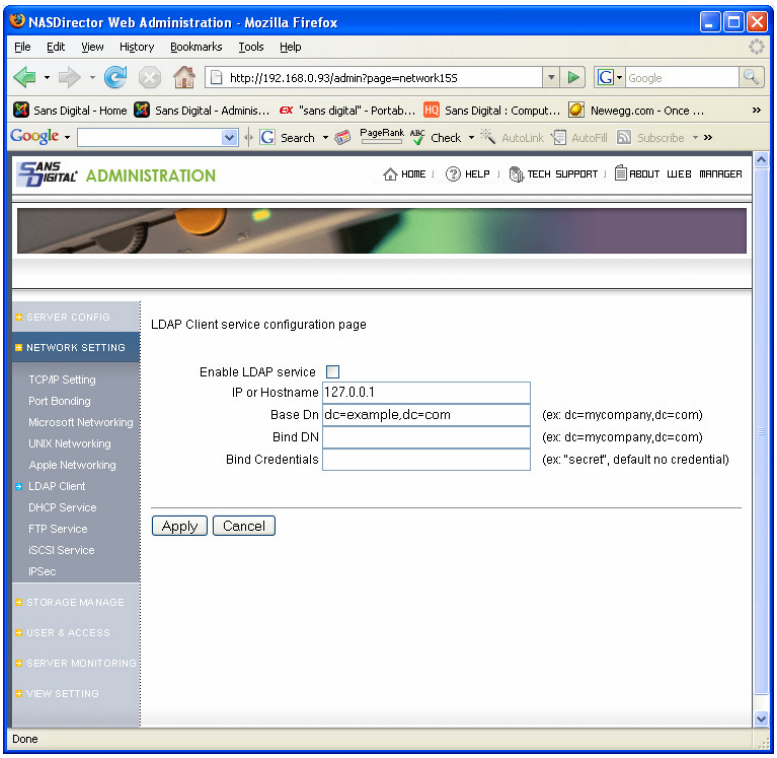
LDAP server access can be done by clicking on **Enable LDAP service**.

To configure LDAP Client Service

1. Input IP or Hostname of LDAP server in **IP or Hostname** field
2. Input company and extension in **Base DN** field. For example, dc=sansdigital,dc=com
3. Input ID and extension to access the LDAP server in **Bind DN**. For example, dc=administrator,dc=sansdigital
4. Input password required to access the LDAP server in **Bind Credentials** field. For example, secret. Default is blank field.

Upon synchronization, user list will be listed in the **Local User** and **Local User Group** list.

NOTE: MN4L+ seeks and lists users and groups in the order of **Local**, **LDAP**, **NIS**, and **ADS/PDC**. In the event where you have UID duplicated, above order will be used to list and accept duplicated users and groups.



Network Setting – DHCP Service

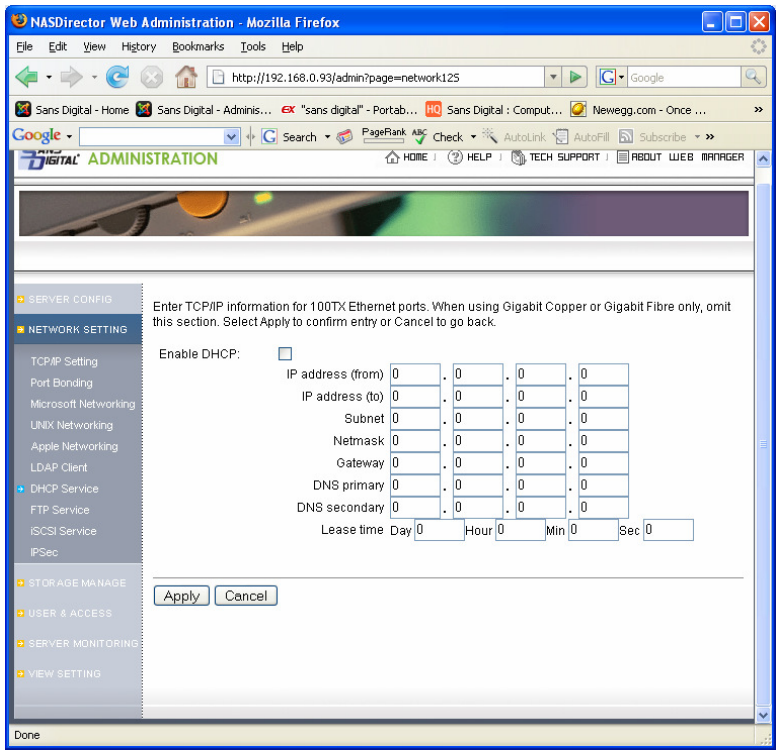
DHCP service on MN4L+ can be used to quickly assign IP addresses to the network attached clients. In other words, now the NAS acts like a DHCP server.

To enable service, check Enable DHCP check box

1. Assign IP address range
2. Enter subnet to assign to the DHCP Clients
3. Enter gateway to assign to the DHCP Clients
4. Enter addresses for primary and/or secondary DNS. Entering both primary and secondary is not absolutely required.
5. For client IP address renewal, input appropriate value in the fields for **Day, Hour, Min,** and **Sec.**

NOTE: The DHCP service on MN4L+ is not intended to replace the DHCP server of Active Directory Service, Primary Domain Controller or Network Information Service. This feature is to provide convenient management of local clients that are not part of aforementioned network infrastructure.

To apply changes, click on **Apply** at the bottom of the screen. To exit without applying changes and return to the home page, click on **Cancel**.



Network Setting – FTP Service

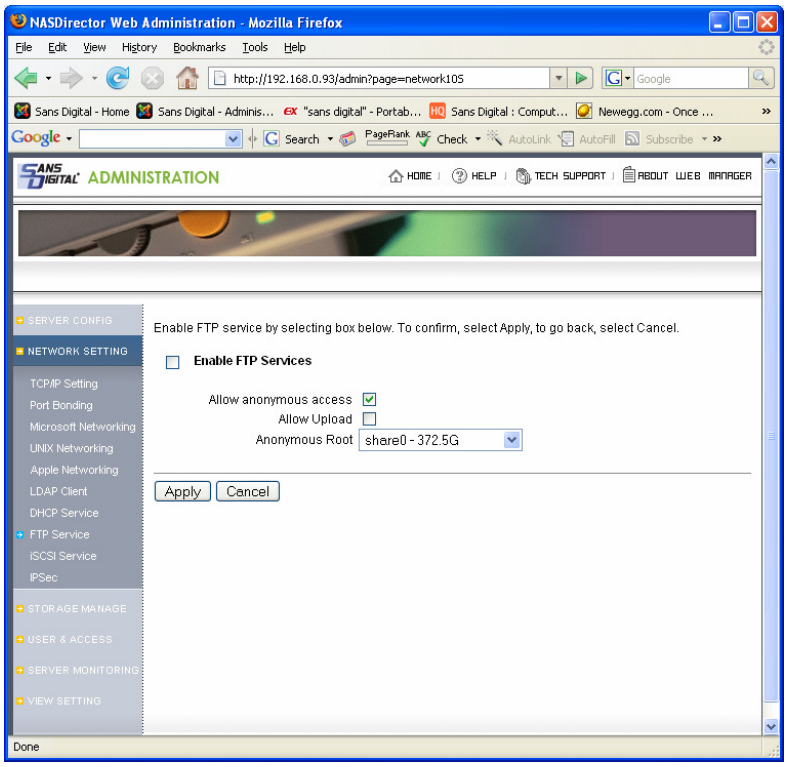
FTP service for MN4L+ can be enabled by selecting the **Enable FTP Service** box.

Following features are supported by FTP

5. **Allow anonymous access**: This feature allows any user, with FTP feature and IP address of the server, to read from the public FTP directory created in MN4L+.
6. **Allow upload**: This feature allows any user, with access to the public directory, to write to the directory.
7. **Anonymous root**: This selects the Logical Volume, which the public directory will reside.
8. **Disallow directory browse**: This feature prevents any logged in users to browse beyond that directory that the user has been given permission to access.

NOTE: For security, it is recommended that FTP service is provided behind a properly configured firewall to minimize unwanted intrusion over the network.

To apply changes, click on **Apply** at the bottom of the screen. To exit without applying changes and return to the home page, click on **Cancel**.



Network Setting – iSCSI Service

MN4L+ is equipped with iSCSI initiator and target services.

iSCSI initiator allow to attach multiple iSCSI target devices and convert them to Logical Volumes for client access. iSCSI target devices may be locally resident within MN4L+ or from a remote/external system.

iSCSI target is doing the opposite, it converts part of the physical capacity into iSCSI target volume and present to the network clients as if a local disk.

To enable the initiator service, check the **Enable iSCSI Initiator Service** check box.

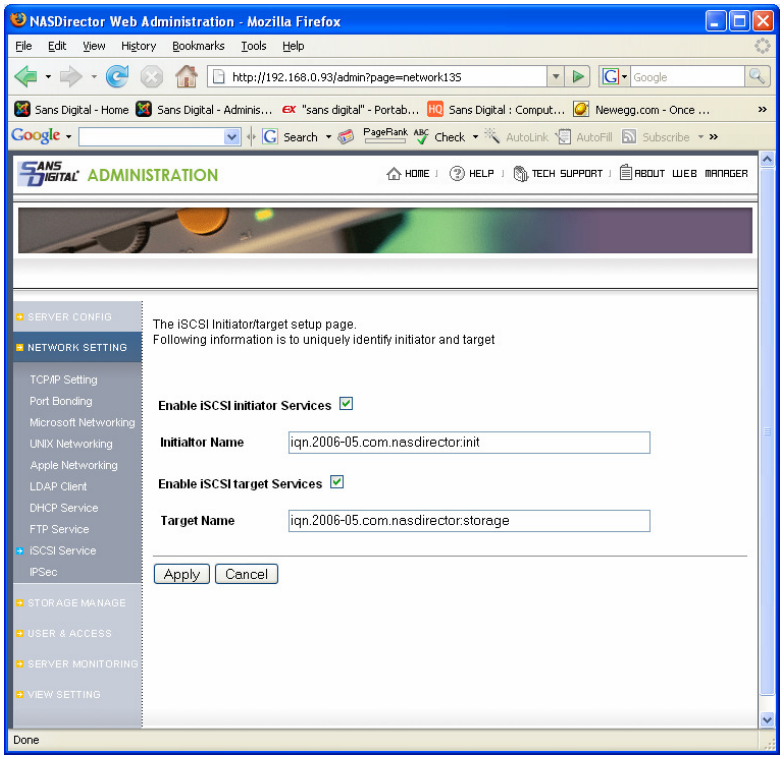
For initiator name, either use the default name or rename it following the rules for iSCSI node names. Rules for building iSCSI node names are described in the iSCSI specification and the "String Profile for iSCSI Names" internet draft. In summary the rules are as follows:

- Node names are encoded in the UTF8 character set. Note the initiator service does not support UCS-4 characters. RFC 2044 describes UTF8 encoding.
- Node names are 223 bytes or less
- Node names may contain alphabetic characters (a to z), numbers (0 to 9) and three special characters: '.', '-', and ':'.
- Uppercase characters are always mapped to lowercase.

To enable the target service, check the **Enable iSCSI Target Service** check box.

For target name, use the default name given, or, follow the requirements described in the iSCSI specification.

To apply changes, click on **Apply** at the bottom of the screen. To exit without applying changes and return to the home page, click on **Cancel**.



Storage Management – RAID Volume Manager

The MN4L+ LB model equipped with Areca PCI-Express/PCI-X RAID controller.

This "RAID Volume Manager" is to create RAID array with the PCI RAID controller.

Click on the button "Launch RAID Volume Manager" will bring up the Areca Web GUI in a separate window.

For detail how to configure RAID array, please refer to the **RAID User Guide**.

Remarks:

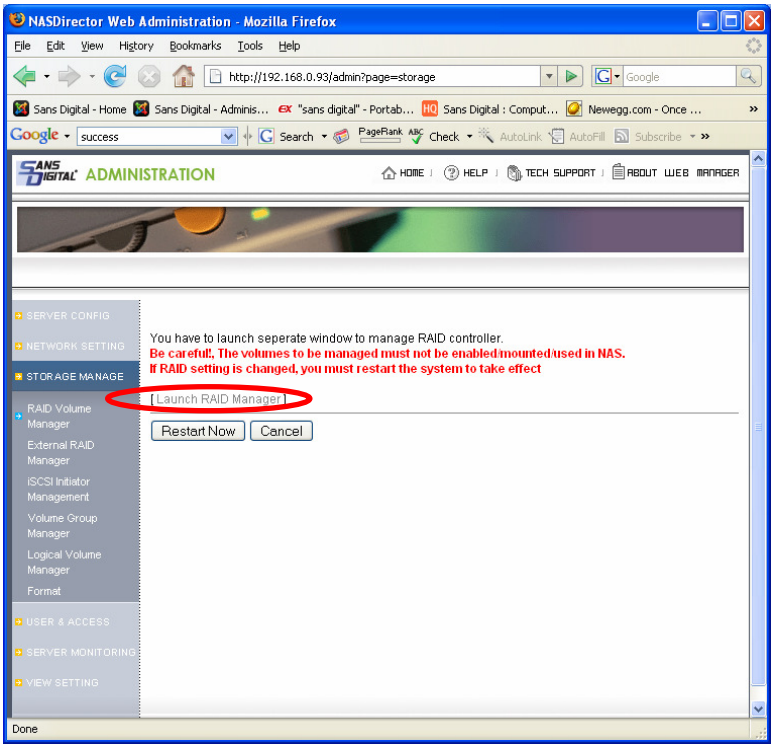
- If the RAID volume is greater than 2TB, please select the option "64bit LBA" to create volume
- All RAID events will get pass to the NAS server event log.
- If you make any changes on the RAID array, such as: create volume, delete volume, add HotSpare, etc, Click "Restart" at the end so that those changes will take effect.

After restart, the RAID volume(s) will show up in the "RV Pool" (Raw Volume group), and be ready to be moved to the "PV Pool" (Physical Volume Group Pool).

NOTE: More information on RV and PV located under Storage Management – Volume Group Manager sections.

Each RAID volume is corresponding to a RV (raw volume) in NAS; Therefore:

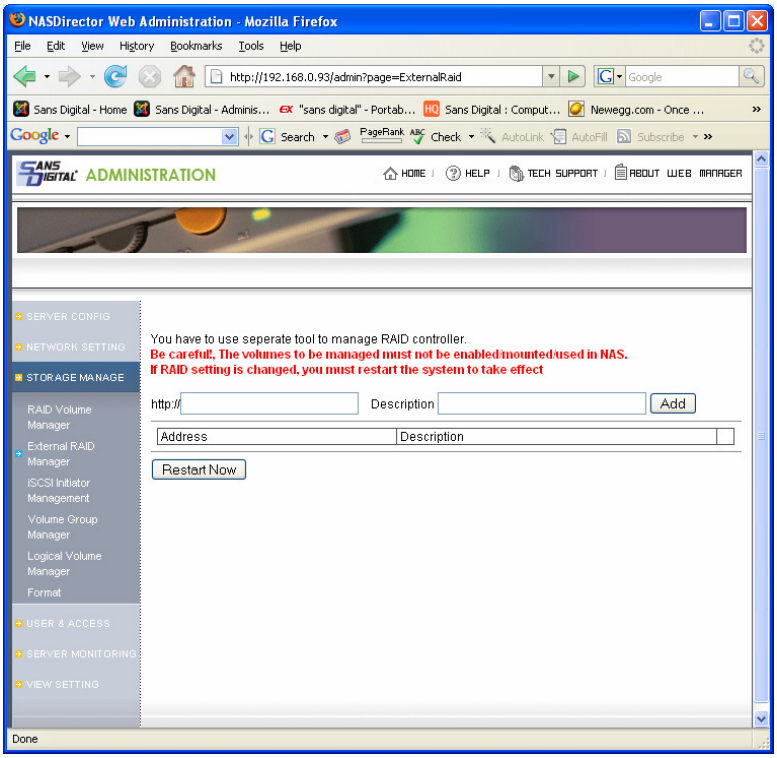
- If you have one RAID volume, there is one RV in NAS
- If you have two RAID volumes, there are two RVs in the NAS, and so on.


NASDirector Web Administration - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=storage
ADMINISTRATION
HOME HELP TECH SUPPORT ABOUT WEB MANAGER
SERVER CONFIG
NETWORK SETTING
STORAGE MANAGE
RAID Volume Manager
External RAID Manager
iSCSI Initiator Management
Volume Group Manager
Logical Volume Manager
Format
USER & ACCESS
SERVER MONITORING
VIEW SETTING
You have to launch seperate window to manage RAID controller.
Be careful!, The volumes to be managed must not be enabled/mounted/used in NAS.
If RAID setting is changed, you must restart the system to take effect
[Launch RAID Manager]
Restart Now
Cancel
Done

Storage Management – External RAID Volume Manager

The MN4L+ LG(Gateway model) supports external RAID boxes. The "External RAID Volume Manager" allows to you key in the IP address of the external RAID Web GUI portal and define a name for it. By clicking on the ip, the corresponding external RAID Web GUI will get brought up in a separate window.

If you change the volume setting with the external RAID, make sure to click "Restart" to allow the changes take effect.



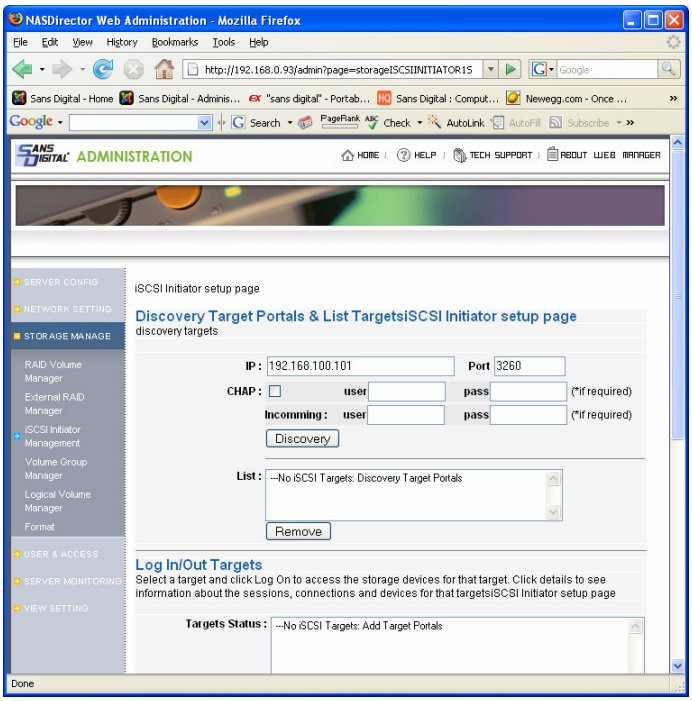
Storage Management – iSCSI Initiator Manager

iSCSI Initiator Manager is used to discover and connect to the iSCSI target devices internal or external to the AccuNAS system. Connecting to the iSCSI target device offers following benefits:

- Expand storage volume when adding more disk drives within the AccuNAS is not possible.
- Use MN4L+ as a gateway to manage Logical Volumes residing in both internal and/or external to AccuNAS system.
- Aggregates multiple iSCSI target devices as a single, large, storage space
- Provides an alternative to Fibre Channel or SCSI bus to connect to external storage subsystem

To discover available iSCSI target portals and iSCSI target devices

1. Input IP address and Port number (3260 is default) of the system that contains iSCSI target devices
2. If Challenge Handshake Authentication Protocol (CHAP) is applied to the iSCSI target devices, input the user ID and password for Outgoing and Incoming. **Outgoing** is used when the system connecting **TO** the iSCSI target device requires user ID and password. **Incoming** is to authenticate the system where iSCSI target device resides. In the case of incoming authentication, **it is the iSCSI target device system authenticating TO the initiator system.**
3. Click on **Discovery** and list of iSCSI target devices will displayed on the **List** field
4. To remove any iSCSI target device from the **List**, click on the device and select **Remove** button



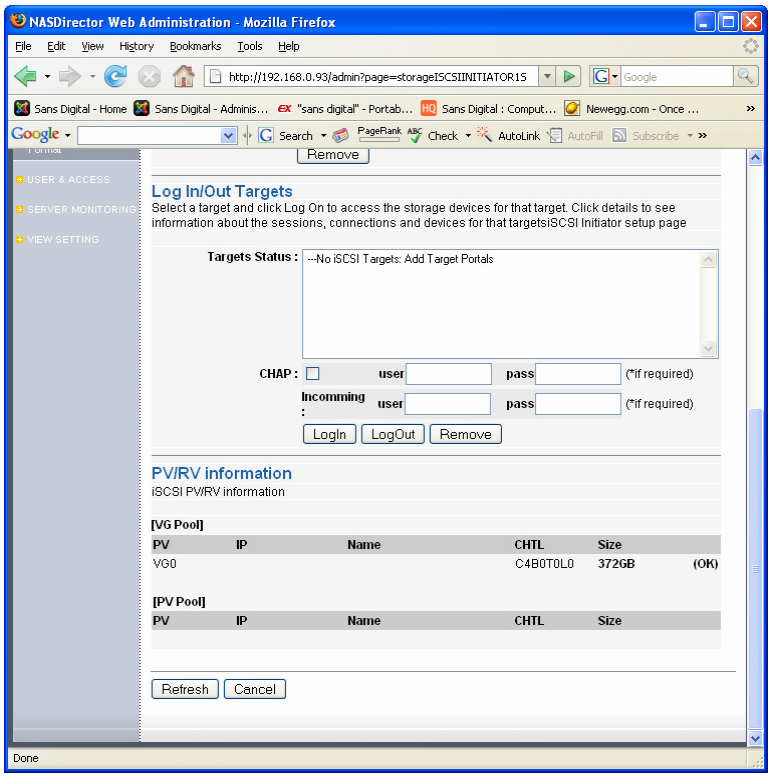
Connecting in and disconnecting iSCSI target devices

1. Select desired iSCSI target device to connect to
2. if CHAP is applied to the selected iSCSI target device, input appropriate **Outgoing** and **Incoming** user ID and password
3. Select **Log In** button to connect.
4. To disconnect, select the desired iSCSI target device then click on **Log Out** button

PV/RV Information

This section shows the list of iSCSI target devices that are available to connect and those that are already connected with the initiator. **PV Pool** shows the iSCSI target devices that were connected and became part of Physical Volume list. **RV Pool** shows the available iSCSI target devices that have not been connected.

NOTE: More information on RV and PV located under Storage Management – Volume Group Manager sections.


NASDirector Web Administration - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=storageISCSIINITIATOR15
Sans Digital - Home
Sans Digital - Adminis...
"sans digital" - Portab...
Sans Digital : Comput...
Newegg.com - Once ...
Search
PageRank
Check
AutoLink
AutoFill
Subscribe
USER & ACCESS
SERVER MONITORING
VIEW SETTING
Remove
Log In/Out Targets
Select a target and click Log On to access the storage devices for that target. Click details to see information about the sessions, connections and devices for that targetsiSCSI Initiator setup page
Targets Status :
---No iSCSI Targets: Add Target Portals
CHAP :
user
pass
(*if required)
Incomming :
user
pass
(*if required)
LogIn
LogOut
Remove
PV/RV information
iSCSI PV/RV information
[VG Pool]
PV IP Name CHTL Size
VG0 C4B0T0L0 372GB (OK)
[PV Pool]
PV IP Name CHTL Size
Refresh
Cancel
Done

Storage Management – Volume Group Manager

Volume Group Manager is to write the NAS signature to the RAID volume (RV – raw volume) which turns a RV into PV. When **Physical Volume (PV)** is created, it is ready to be converted into **Logical Volume (LV)** for file serving.

Volume Group Types/Definitions

- **Raw Volume (RV)** is the RAID volume(s), or external iSCSI target(s) that are unformatted. The next step is to convert RV into PV.
- **Physical Volume (PV**) is a volume that is ready to be partitioned and formatted with a file system, and converted into Logical Volume (LV).
  Note: PV is automatically formatted and converted to LV having the equal capacity as the PV. In the case of converting iSCSI target device or SCSI device to PV, manual creation of LV is required.
- **Logical Volume (LV)** is a volume/share/folder that has been partitioned and formatted and ready to be used by attached clients.

Volume Group Manager features

- Converts RV to PV
- Add RV to PV, thus, creating Expanded PV
- Remove PV to RV Pool
- Remove or Replace RV that's been added to PV

Creating PV

Creating PV is to convert the RV from the **RV Pool** to PV. Once RV is converted to PV, it is ready to be converted to **Logical Volume** (LV). Conversion from PV to LV means PV is formatted and ready to be used by network clients attached to MN4L+.

To create PV, select the desired RV and click on **Create PV.**

Removing PV

PV's in the **PV Pool** or **Expanded PV Pool** can be removed and converted into RV.

To remove PV, select the desired PV from the PV Pool, or Expanded PV Pool, and click on **Remove PV.**

Adding RV to PV

RV's in the **RV Pool** can be added to the PV in the **PV Pool** to expand the capacity of the original PV, or, insert more LV's.

To add the RV to the PV, select the desired RV and the PV and click on **Add RV to PV.** This process adds RV to the existing PV, thus, creating the Expanded PV. Now, the added RV is named as PV.

NOTE: RV's that were iSCSI target device or SCSI device require manual conversion into LV to be usable by the attached clients.

To separate the PV from Expanded PV

To remove the PV that's been added to the PV, click on the PV from the Expanded PV Pool and click on **Remove PV from PV.** This process removes the PV from the Expanded PV, converts the PV to RV and places it in the RV Pool as an RV.

Physical Volume Expansion may be used to combine multiple PV's to create a single, large PV. This process can be useful when combining multiple PV's belonging to different RAID controller cards.

To replace the PV in the Expanded PV with another RV

To replace a PV belonging to Expanded PV with another RV, all necessary volumes can be selected at once rather than removing first, then, adding next.

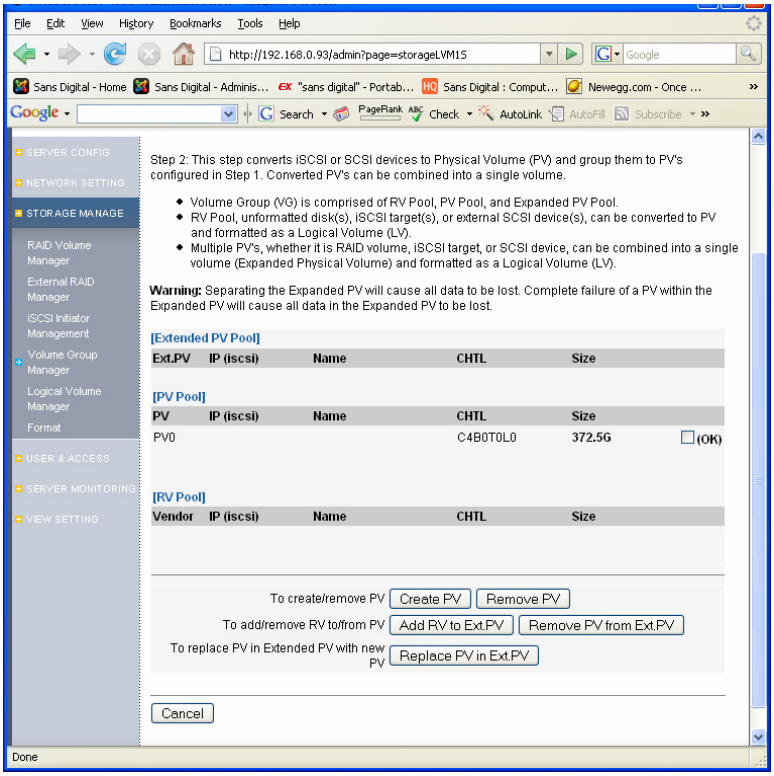
Select the PV belonging to Expanded PV, select the RV you wish to replace the PV selected, then click on **Replace PV in Exp. PV.**

Remarks: By default, once the PV is created, the NAS **automatically** converts the **ENTIRE capacity** of PV into LV with XFS file system. If other setting is desire, please use the "**Logical Volume Manager**" to delete the existing volume, and re-create volume(s) in different size and different file system.

CAUTION: Deleting Physical Volume will result in deletion of any Logical Volume and Snapshot Volume associated with the Physical Volume.

CAUTION: Removing PV, Separating PV, or Replacing PV will cause the PV to lose its data.

Selecting **Cancel** will take you back to the Home page.


File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=storageLVM1S
SERVER CONFIG
NETWORK SETTING
STORAGE MANAGE
RAID Volume Manager
External RAID Manager
iSCSI Initiator Management
Volume Group Manager
Logical Volume Manager
Format
USER & ACCESS
SERVER MONITORING
VIEW SETTING
Step 2: This step converts iSCSI or SCSI devices to Physical Volume (PV) and group them to PV's configured in Step 1. Converted PV's can be combined into a single volume.
Volume Group (VG) is comprised of RV Pool, PV Pool, and Expanded PV Pool.
RV Pool, unformatted disk(s), iSCSI target(s), or external SCSI device(s), can be converted to PV and formatted as a Logical Volume (LV).
Multiple PV's, whether it is RAID volume, iSCSI target, or SCSI device, can be combined into a single volume (Expanded Physical Volume) and formatted as a Logical Volume (LV).
Warning: Separating the Expanded PV will cause all data to be lost. Complete failure of a PV within the Expanded PV will cause all data in the Expanded PV to be lost.
[Extended PV Pool]
Ext.PV IP (iscsi) Name CHTL Size
[PV Pool]
PV IP (iscsi) Name CHTL Size
PV0 C4B0T0L0 372.5G (OK)
[RV Pool]
Vendor IP (iscsi) Name CHTL Size
To create/remove PV
Create PV
Remove PV
To add/remove RV to/from PV
Add RV to Ext.PV
Remove PV from Ext.PV
To replace PV in Extended PV with new PV
Replace PV in Ext.PV
Cancel
Done

Storage Management - Logical Volume Manager

Logical Volume (LV) is a formatted storage volume in PV, which can be shared by network clients attached to MN4L+. In other words, LV is the network share/folder that can be shared and accessed by network clients.

Note: By default, once the PV is created, the NAS **automatically** converts the **ENTIRE capacity** of PV into LV with XFS file system. If other setting is desired, please delete the existing volume first, and re-create volume(s) in different size and different file system.

Note: by default, all users are given access to a logical volume. To assign exclusive access to specific users or user groups, go to the **User and Access** section.

Functions of Logical Volume Manager are:

1. Create Logical Volume
2. Designate file system or iSCSI to Logical Volume
3. Modify Logical Volume
4. Delete Logical Volume

Create a Logical volume: To create a new Logical Volume, follow the steps below:

1. Select a Physical Volume with available space from the **Physical Volume** drop-down list.
2. Enter a unique name in the **Volume Name** field using up to 15 alphanumeric characters with no spaces.
   NOTE: Do not use identical names for Logical Volumes, even if they belong to different Physical Volumes.
3. If it is beneficial to add a description of this Logical Volume to help identify its use, enter that description in the **Volume Description** field using up to 50 alphanumeric characters. This is an optional field.
4. Enter the storage size of the Logical Volume in Megabytes in the **Volume Size** field, keeping in mind the amount of available space.
5. Designate the Logical Volume to select a file system of: **ReiserFS**, **XFS**, or **iSCSI**(target).
   Remarks: if **SFM** (NAS Mirroring and Failover) is intended to be used, please select **ReiserFS** for it has better resistant to sudden power lost or sudden shutdown for whatever reasons.
6. Click on **Create** at the bottom of the page.
7. Repeat the above steps to create additional logical volumes.

To exit and return to the home page, click on **Cancel**.

Remarks on iSCSI Target Volume:

If iSCSI target volume is selected instead of XFS or RerserFS, please **pay extra attentions** to following points:

(1) Do Not use underscore "_" in the iSCSI target volume name.

(2) Regardless how many iSCSI target volumes you have on the NAS, they are all using port **3260**. So from the initiator side, you only need to specify one single IP plus port **3260**, and all the iSCSI volumes on the NAS will be visible. The permission to access each iSCSI target volume is controlled by the iSCSI ACL section.

(3) If use Microsoft iSCSI initiator to connect to the iSCSI target volume on the NAS, make sure you define the iSCSI volume as "**basic disk**" under Windows Disk-Manager, if you define the iSCSI volume as "dynamic disk", it will not survive the system reboot/restart and will require "reactivate" upon reboot.

(4) If a successful connection has been established between Microsoft iSCSI initiator and the iSCSI target volume on the NAS, but later on, you decide to change the IP address on the NAS, then, you must follow the procedure below to re-established the iSCSI connection:

   (a) Log-off the target from MS iSCSI Initiator
   (b) Remove the NAS IP from the "Discovery → Target Portal" from MS iSCSI Initiator
   (c) From AccuNAS, go to: "Network Setting" → "TCP/IP Setting" to change the IP
   (d) Go to "Network Setting" → "iSCSI Service"
   First, **un-check** "**iSCSI Target Service**", click "**Apply**"
   Then, **re-check** "**iSCSI Target Service**", click "**Apply**"
   (e) Now, go back to MS iSCSI initiator, from the "Discovery → Target Portal", Enter the new IP address of the NAS with port 3260.
   (f) Now re-do the target logon.

   Fail to follow these steps may cause "authentication" failure after changing the IP of the NAS.

Modify a Logical Volume: To modify an existing Logical Volume, follow the steps below:

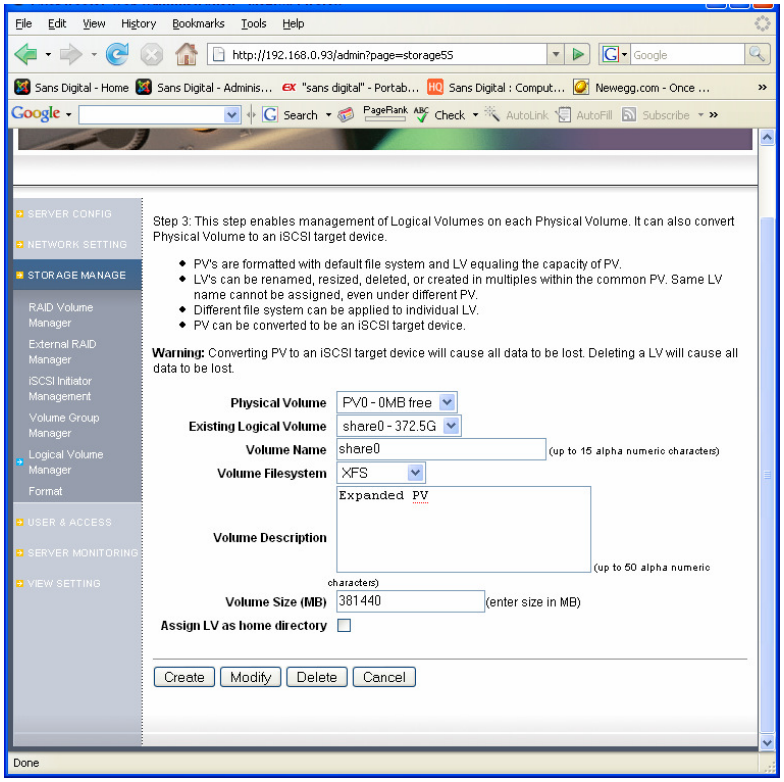
1. Select the Physical Volume that contains the Logical Volume you wish to modify from the **Physical Volume** drop-down list. A list of Logical Volumes for the selected Physical Volume appears in the **Existing Logical Volume** window.
2. Select the Logical Volume to modify from the **Existing Logical Volume** drop-down list. The current Logical Volume information is immediately displayed on the screen.
3. Modify the **Volume Name**, **Volume Description**, **Volume Type** and/or **Volume Size**, as appropriate.
   NOTE: Converting the Logical Volume from one file system to the other will erase the data.
4. Click on **Modify** at the bottom of the page to apply changes.
5. Most likely, you need to restart the NAS after modifying a volume.
   NOTE: Size cannot be modified if Snapshot Volume exists for that Logical Volume.

To exit and return to the home page, click on **Cancel**.

Delete a Logical Volume: To delete an existing Logical Volume, follow the steps below:

1. Select the Physical Volume that contains the Logical Volume you wish to delete from the **Physical Volume** drop-down list. A list of Logical Volumes for the selected Physical Volume appears in the **Existing Logical Volume** window.
2. Select the Logical Volume to delete from the **Existing Logical Volume** drop-down list.
   CAUTION: Deleting Logical Volumes cannot be undone and data will be lost. Be sure to select the correct Logical Volume. If Snapshot Volume is associated with selected Logical Volume, Snapshot Volume must be deleted first.
3. Click on **Delete** at the bottom of the page. The selected Logical Volume is removed from the **Select Logical Volume** list.
   NOTE: Logical Volume cannot be deleted if Snapshot Volume exists for that Logical Volume.

To exit and return to the home page, click on **Cancel**.


File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=storageSS
SERVER CONFIG
NETWORK SETTING
STORAGE MANAGE
RAID Volume Manager
External RAID Manager
iSCSI Initiator Management
Volume Group Manager
Logical Volume Manager
Format
USER & ACCESS
SERVER MONITORING
VIEW SETTING
Step 3: This step enables management of Logical Volumes on each Physical Volume. It can also convert Physical Volume to an iSCSI target device.
PV's are formatted with default file system and LV equaling the capacity of PV.
LV's can be renamed, resized, deleted, or created in multiples within the common PV. Same LV name cannot be assigned, even under different PV.
Different file system can be applied to individual LV.
PV can be converted to be an iSCSI target device.
Warning: Converting PV to an iSCSI target device will cause all data to be lost. Deleting a LV will cause all data to be lost.
Physical Volume
PV0 - 0MB free
Existing Logical Volume
share0 - 372.5G
Volume Name
share0
(up to 15 alpha numeric characters)
Volume Filesystem
XFS
Volume Description
Expanded PV
(up to 60 alpha numeric characters)
Volume Size (MB)
381440
(enter size in MB)
Assign LV as home directory
Create
Modify
Delete
Cancel
Done

Storage Management - Format

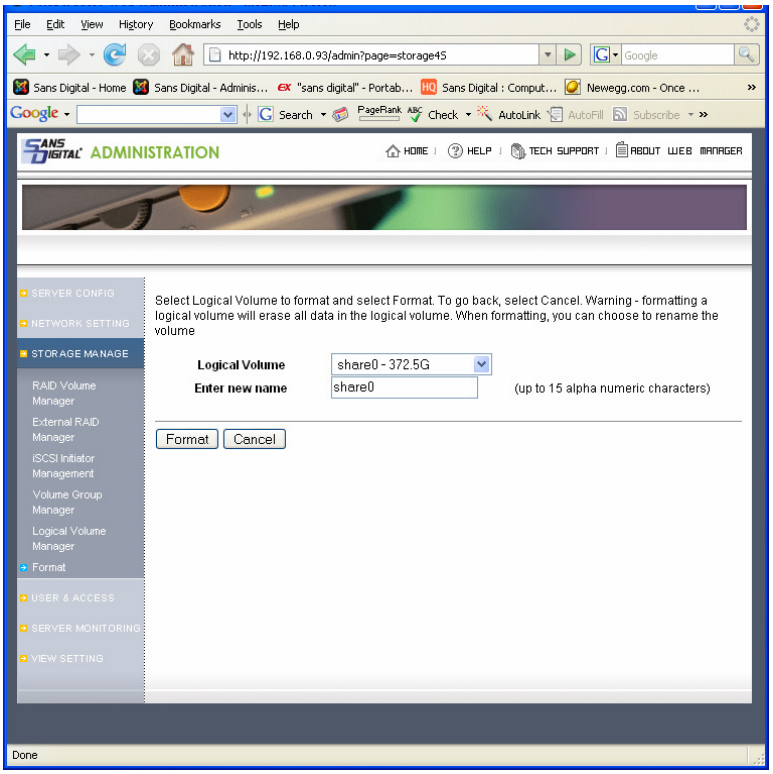
Format a logical volume to erase all of its contents. Although it is not required, you can also change the logical volume name.

CAUTION: Formatting a physical volume cannot be undone and you will be asked to confirm your request. Be sure to move data you need to save to another location before formatting the volume.

To format a logical volume, follow the steps below:

4. Select the logical volume from the **Logical Volume** drop-down list.
5. If you wish to change the volume name (optional), enter a new name in the **Enter New Name** field using up to 15 alphanumeric characters with no spaces.
6. Click on **Format**. The NAS immediately begins to format the selected logical volume.

To exit without formatting and return to the home page, click on **Cancel**.


File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=storage45
ADMINISTRATION
HOME HELP TECH SUPPORT ABOUT WEB MANAGER
SERVER CONFIG
NETWORK SETTING
STORAGE MANAGE
RAID Volume Manager
External RAID Manager
iSCSI Initiator Management
Volume Group Manager
Logical Volume Manager
Format
USER & ACCESS
SERVER MONITORING
VIEW SETTING
Select Logical Volume to format and select Format. To go back, select Cancel. Warning - formatting a logical volume will erase all data in the logical volume. When formatting, you can choose to rename the volume
Logical Volume
share0 - 372.5G
Enter new name
share0
(up to 15 alpha numeric characters)
Format
Cancel
Done

User & Access - Local User Management

Local users are those user accounts that are created within MN4L+ manually and specifically for access to MN4L+ files and folders. Once local users are created, they can be assigned to logical volumes as individual users or as part of a user group.

Note:

- "Local users" are Windows clients who do not belong to a Windows Domain and Windows Active-Directory, and often, "local users" are referred to as "Workgroup" users.
- Mac/APF clients are defined as "local users".

Create Local Users

To **create** local users, enter the following information for each user:

1. **User Name -** Enter the first and last name of the user with a maximum of 25 characters.
2. **Password -** Enter a unique password for the above user between 6-8 alphanumeric characters without spaces. The password is case-sensitive.
3. **Confirm Password -** Re-enter the password again to confirm entry.
4. **Assign Home Directory -** Select this option to provide a home directory for this user. A home directory is a private directory that only the owner and administrator can see.
5. **Logical Volume** - Select the Logical Volume to store local user's home directory.
6. Click on **Create** to add the user to the local user list.
7. Repeat the steps above to create additional local users.

To undo changes and return to the home page, click on **Cancel**.

NOTE: MN4L+ seeks and lists users and groups in the order of **Local**, **LDAP**, **NIS**, and **ADS/PDC**. In the event where you have UID duplicated, above order will be used to list and accept duplicated users and groups.

Access to User's Home Directory

Home directory is a private directory for each local user. Home directory cannot be opened by other users other than the owner and the administrator. Home directory can be accessed by using two methods:

1. Map to the Logical Volume Share that contains your home directory.
2. Access via. Web browser by typing in ftp://username@server name or IP address of the server

Modify/Delete Local Users

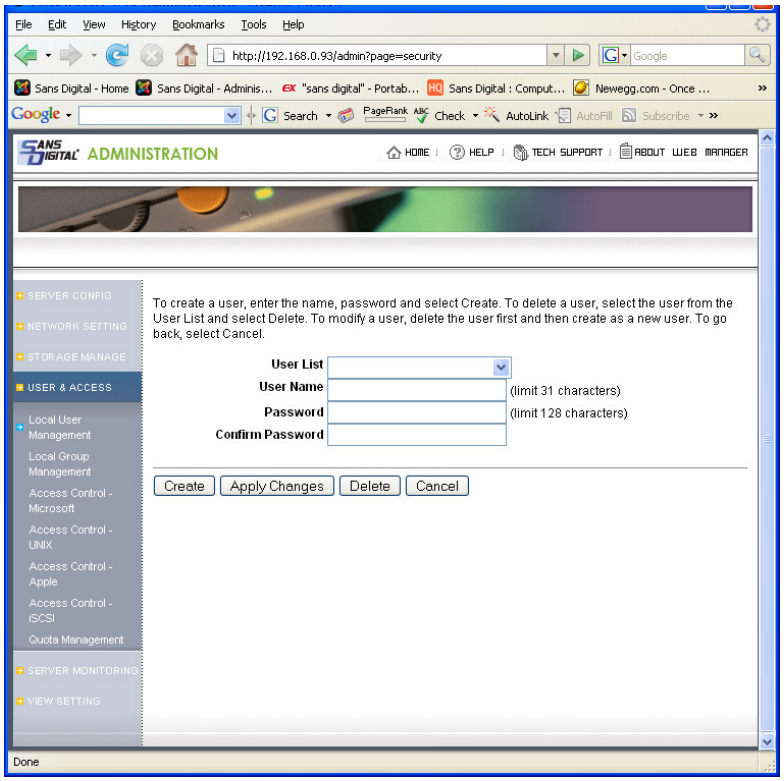
To **delete** a user from the local users' list, follow the steps below:

1. Select the user to delete from the **User List**.
   CAUTION: Deleting users cannot be undone and you will be asked to confirm deletion. Be sure to select the correct user(s).
2. Click on **Delete**. The selected user is immediately removed from the **User List**.

To **modify** an existing user, follow the steps below:

1. Select the user from the **User List**.
2. Change user name or password, and select **Apply Changes**.

To undo changes and return to the home page, click on **Cancel**.


File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=security
ADMINISTRATION
HOME | HELP | TECH SUPPORT | ABOUT WEB MANAGER
SERVER CONFIG
NETWORK SETTING
STORAGE MANAGE
USER & ACCESS
Local User Management
Local Group Management
Access Control - Microsoft
Access Control - UNIX
Access Control - Apple
Access Control - iSCSI
Quota Management
SERVER MONITORING
VIEW SETTING
To create a user, enter the name, password and select Create. To delete a user, select the user from the User List and select Delete. To modify a user, delete the user first and then create as a new user. To go back, select Cancel.
User List
User Name
(limit 31 characters)
Password
(limit 128 characters)
Confirm Password
Create
Apply Changes
Delete
Cancel
Done

User & Access - Local User Group Management

User groups are formed to easily manage a group of users and apply access levels to the entire group for specific logical volumes. The new user groups you create will be available to assign to logical volumes on the **Access Control – Microsoft** and **Access Control - Apple**.

Create Local User Groups

To **create** a new local user group, follow the steps below:

1. Enter a unique name for the user group in the **Local User Group Name** field, up to a maximum of 15 alphanumeric characters.
2. Click on **Create**. The new local user group appears on the **Local Groups** list.
3. To add users to the user group, select the group from the **Local Groups** list.
4. Select the user from the **All Users** list and click on **Add**. Multiple users can be selected using the **Ctrl** and **Shift** keys.
5. Repeat the steps above to create additional user groups.

To exit and return to the home pages, click on **Cancel**.

NOTE: MN4L+ seeks and lists users and groups in the order of **Local**, **LDAP**, **NIS**, and **ADS/PDC**. In the event where you have UID duplicated, above order will be used to list and accept duplicated users and groups.

Modify/Delete Local User Groups

To **modify** a user group, follow the steps below:

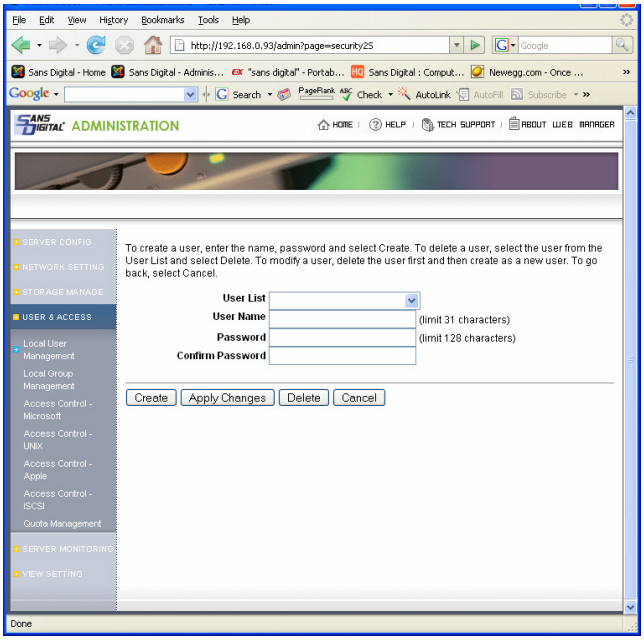
NOTE: To change the name of the user group, you must delete the existing user group and re-create with the desired name.

1. Select the user group to modify from the **Local Groups** list. The members of the user group are immediately displayed in the **Group Users** list.
2. Add and/or remove a user by selecting the user from the **All Users** list and clicking on **Add** or selecting the user from the **Group Users** list and clicking on **Remove**.
3. Repeat the steps above until you have modified all necessary user groups.

To **delete** a user group, follow the steps below:

1. Select the user group to delete from the **Local Groups** list.
   CAUTION: Deleting user groups cannot be undone and you will be asked to confirm deletion. Be sure to select the correct user group(s).
2. Click on **Delete**. The selected user group is immediately removed from the **Local Groups** list.

To exit and return to the home page, click on **Cancel**.



User & Access - Access Control: Microsoft Windows

Once logical volumes have been created, users or user groups can be assigned to have access to specific logical volumes. By default, all users are given access to a new logical volume. You can assign exclusive access rights to a logical volume to one user group or individual user. Furthermore, you can specify an individual user, who is part of a user group, to have higher or lower access level than the rest of the group.

This section controls the access control at the directory level. For sub-directory and file level access control, user must assign them directly to the sub-directory, or file, from the Microsoft Windows client.

Assign Access Control

To assign users and/or user groups access to a logical volume, follow the steps below:

1. Select the logical volume that you wish to give user access to from the **Select Logical Volume** drop-down list.
2. Select the users and/or user groups from the **All Users** list.
3. Select one of the following access levels:
    - **Full Control** – read, write, and delete file privileges to the selected logical volume
    - **Read/Write** – read and write files to the selected logical volume. Users will not be able to delete files.
    - **Read Only** – read privileges to the selected logical volume. Users will not be able to add new files, modify files or delete files.
    - **Deny** – all access is denied to the selected logical volume for the user. This is necessary when you wish to give access to a user group except for an individual user within that group. Any individual user within a user group can be assigned with different access level from the rest of the user group by assigning a different access level to the individual user for the logical volume. The individual user access level takes priority over the user group access level. User will not be able to read, write or delete any files within the logical volume.
4. Click on **Add**.
5. To remove a user or user group from the logical volume, select them from the **Assigned Users** list and click on **Remove**.
6. Repeat steps 2 through 5 above to add or delete additional users and/or user groups to the logical volume.

To exit and return to the home page, click on **Cancel.**

Host IP Blocking

In addition to user level access control, you can specify host-level security. To add or delete an IP address, follow the steps below:

Adding an IP Address

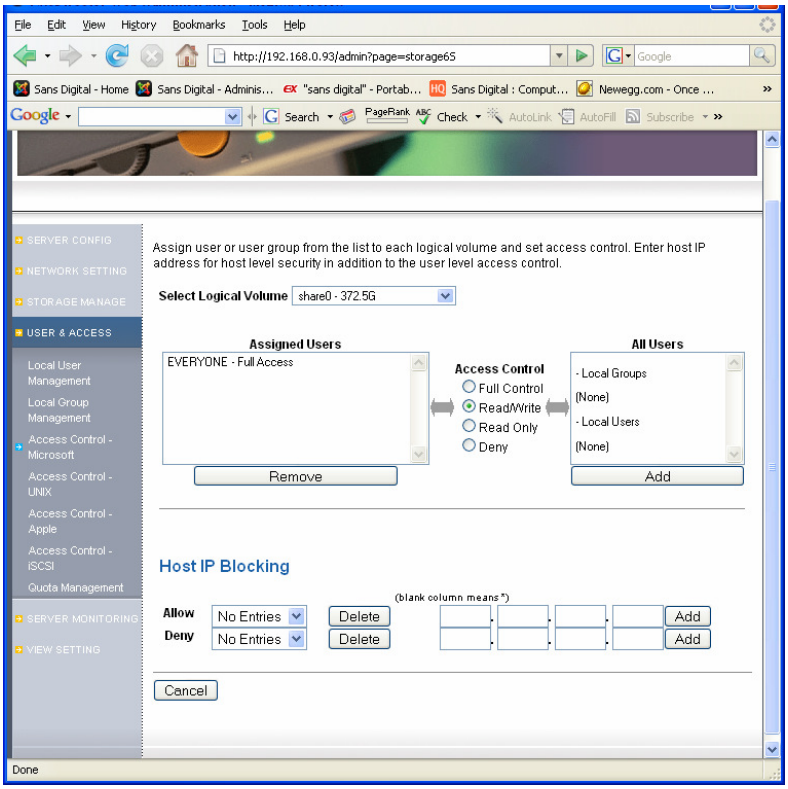
1. Select the logical volume that you wish to give host access to from the **Select Logical Volume** drop-down list.
2. Enter IP address of the host in the **Enter IP address** field.
3. Click on **Allow** to allow host access or **Deny** to deny host access to the selected logical volume.
4. Click on **Add**.

Deleting an IP Address

1. Select the logical volume where you wish to delete host access from the **Select Logical Volume** drop-down list.
2. Select the IP address from the **IP Address** drop down list.
3. Click on **Delete**.

To exit and return to the home page, click on **Cancel**.

NOTE: When IP address is added to the Allow list, those on the Allow list are the only host IP addresses that will be allowed to access the Logical Volume. When IP address is added to the Deny list, those on the Deny list are the only host IP addresses that will be denied to access the Logical Volume.



NOTE: **To stop** CIFS service, please log into MN4L+ via. Command Line and type:

#service smb stop

To re-start:

#service smb start

User & Access - Access Control: UNIX

NOTE: Synchronizing MN4L+ with NIS does not automatically give NIS users the access to the Logical Volume. All Logical Volumes to be accessed by NIS users must first be mounted by the host computer.

To add host access:

1. Select the logical volume that you wish to give host access to from the **Select Logical Volume** drop-down list.
2. Type in the IP address of the UNIX host.
3. Select the mounting option. When adding each host to the logical volume, there are four levels of access that can be applied to the host:
    - **Root Squash** – Any user logging in as "root" will be assigned a different user ID so that limited privilege of read/write/delete is assigned to the logged-in user.
    - **All Squash** – Any user logging in will be assigned a different user ID so that limited privilege of read/write/delete is assigned to the logged in user.
    - **Read Only** – Any user logging in can have read-only access.
    - **Secure** – Secure option limits the user that can mount to NFS file system to super users only (TCP/IP port #1024 and below). If a third party application exists that allows non-super users to mount to the NFS file system, secure option should be deselected.
4. Click on **Add**.
5. By default, **Top directory permission** is set to rwx/rwx/rwx. To modify, select desired combination of rwx permissions for owner, group and other, and select **Modify**. **Note**: Sticky bit is used to allow only the root or the owner of the file to unlink or rename the file. When disabled, anyone that has access to the directory can rename or unlink the file.

To delete the host:

1. Select the IP address from **IP Address** drop down box
2. Click on **Delete.**

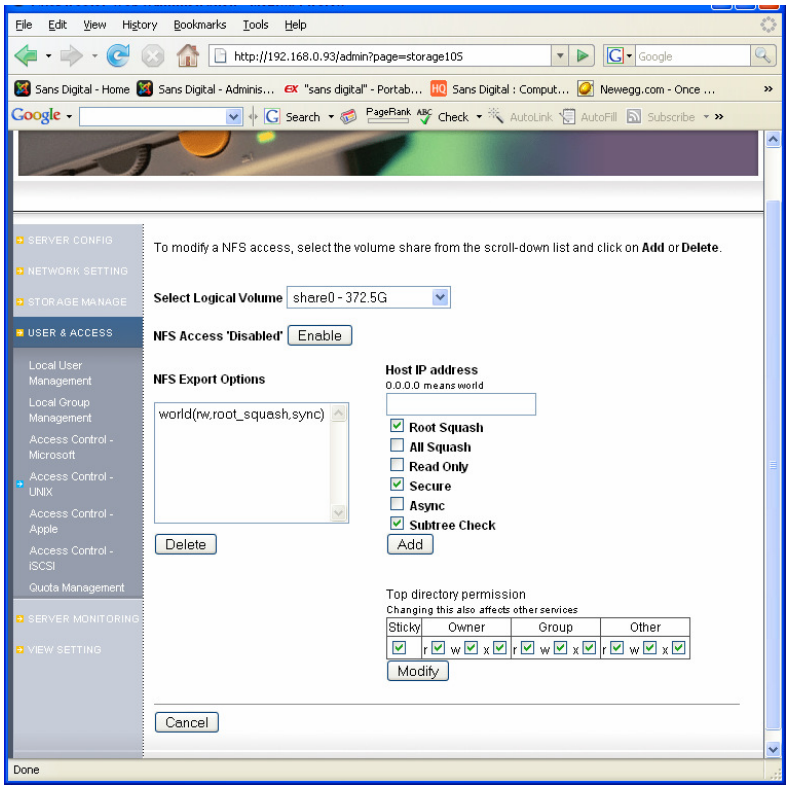
To exit and return to the home page, click on **Cancel**.

NOTE:

- Selecting **Enable NFS Service** under **Network Settings** enables global NFS access. Disabling this option disables NFS access completely.
- Unless NFS access is added with host IP address for each logical volume, NFS access for that logical volume is disabled. As a result, drop down box of the NFS access for the logical volume share indicates **Disabled** as a default.
- Unless each IP address is deleted manually, setting to **Disabled** for the logical volume share does NOT delete IP address(es).

Security Method for NFS Access:

MN4L+ implements standard UNIX security for NFS access. This means that the UNIX host that is added to the logical volume can mount to the logical volume with assigned access privileges. Any user logging into the host is authenticated by the NIS (Network Information Service) server or the UNIX host's own security. After the user is logged into the host, he/she is able to access the logical volume on MN4L+ with read/write/delete or read-only privilege, depending on the access privilege that was assigned to the host. Individual sub-directory created by the user can be secured by applying 1) owner only, 2) user group that the user belongs to, or 3) everyone to the sub-directory.


File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=storage105
SERVER CONFIG
NETWORK SETTING
STORAGE MANAGE
USER & ACCESS
Local User Management
Local Group Management
Access Control - Microsoft
Access Control - UNIX
Access Control - Apple
Access Control - iSCSI
Quota Management
SERVER MONITORING
VIEW SETTING
To modify a NFS access, select the volume share from the scroll-down list and click on Add or Delete.
Select Logical Volume share0 - 372.5G
NFS Access 'Disabled' Enable
NFS Export Options
world(rw,root_squash,sync)
Delete
Host IP address
0.0.0.0 means world
Root Squash
All Squash
Read Only
Secure
Async
Subtree Check
Add
Top directory permission
Changing this also affects other services
Sticky Owner Group Other
Modify
Cancel
Done

User & Access - Access Control: Apple

Once logical volumes have been created, local, or NIS, users or user groups can be assigned to have access to specific logical volumes. By default, all users are given access to a new logical volume. You can assign exclusive access rights to a logical volume to one user group or individual user. Furthermore, you can specify an individual user, who is part of a user group, to have higher or lower access level than the rest of the group.

This section controls the access control at the directory level. For sub-directory and file level access control, user must assign them directly to the sub-directory, or file, from the host.

Assign Access Control

To assign users and/or user groups access to a logical volume, follow the steps below:

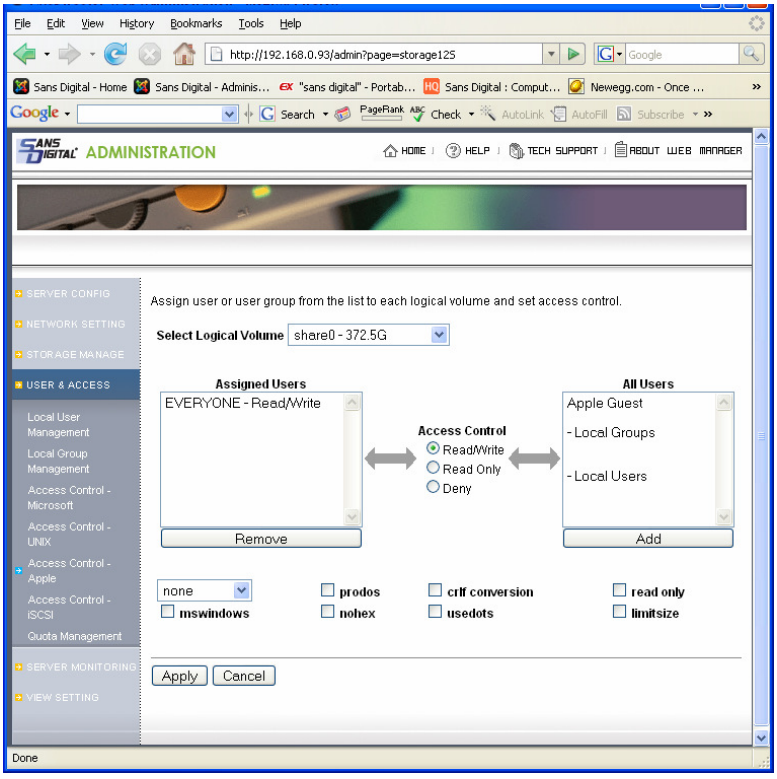
1. Select the logical volume that you wish to give user access to from the **Select Logical Volume** drop-down list.
2. Select the users and/or user groups from the **All Users** list.
3. Select one of the following access levels:
    - **Allow** – read, write, and delete file privileges to the selected logical volume
    - **Read/Write** – read and write files to the selected logical volume. Users will not be able to delete files.
    - **Read Only** – read privileges to the selected logical volume. Users will not be able to add new files, modify files or delete files.
    - **Deny** – all access is denied to the selected logical volume for the user. This is necessary when you wish to give access to a user group except for an individual user within that group. Any individual user within a user group can be assigned with different access level from the rest of the user group by assigning a different access level to the individual user for the logical volume. The individual user access level takes priority over the user group access level. User will not be able to read, write or delete any files within the logical volume.
4. Click on **Add**.
5. To remove a user or user group from the logical volume, select them from the **Assigned Users** list and click on **Remove**.
6. Repeat steps 2 through 5 above to add or delete additional users and/or user groups to the logical volume.

In addition to above options, following options can be set when necessary:

- Casefold option: Casefold option handles how casenames should be mangled. Default Setting is NONE.
    - tolower-: Lower cases names in both directions.
    - toupper-: Upper cases names in both directions.
    - xlatelower-: Client sees lower case, server sees upper case.
    - xlateupper- Client sees upper case, server sees lower case.
- mswindows: Forces filename restrictions imposed by MS WinXX, and invokes the MS default codepage (iso8859-1) if one is not already specified.
- prodos: Provides compatbility with Apple II clients
- nohex: Disables :hex translations for anything except for dot files. This option makes the / character illegal.
- crlf conversion: Enables crlf translation for TEXT files.
- usedots: Don't do :hex translation for dot files. This makes all files such as .Parent, .Apple* illegal. Dot files created on the server side will be invisible to the client.
- read only: Specifies the share as being read only for all users.
- limitsize: Hack for older Macintoshes using newer Appleshare clients to limit the disk size reporting to 2 GB.

To exit and return to the home page, click on **Close**.

Note: Mac/Apple clients can access the NAS share via SMB/CIFS or AFP/AppleTalk. It is up to the end user to pick whichever method that he/she feels comfortable for his/her applications.


File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=storage125
ADMINISTRATION
HOME | HELP | TECH SUPPORT | ABOUT WEB MANAGER
SERVER CONFIG
NETWORK SETTING
STORAGE MANAGE
USER & ACCESS
Local User Management
Local Group Management
Access Control - Microsoft
Access Control - UNIX
Access Control - Apple
Access Control - iSCSI
Quota Management
SERVER MONITORING
VIEW SETTING
Assign user or user group from the list to each logical volume and set access control.
Select Logical Volume share0 - 372.5G
Assigned Users
EVERYONE - Read/Write
Remove
Access Control
Read/Write
Read Only
Deny
All Users
Apple Guest
- Local Groups
- Local Users
Add
none
prodos
crlf conversion
read only
mswindows
nohex
usedots
limitsize
Apply
Cancel
Done

User & Access – iSCSI Target

User and Access control can be applied to iSCSI target device with User ID & Password as well as by Host IP of the client.

- **Global Users** define the access control for all iSCSI target devices within MN4L+. Having access as a global user allows this user to scan and view all iSCSI target devices in the system.
- **Target Users** define the access control for individual iSCSI target device. Each target device may have different user ID and password, thus, user may not have access to all of the target devices in the system.
- **Host IP Blocking** controls access to each iSCSI target device by allowing or disallowing Host IP addresses of the client. This feature is a subset of **Target Users**, thus, each iSCSI target device must have its own **Host IP Blocking** list.

To Create User:

There are two ways to control access at the user level:

1. **Incoming**: Incoming user and password controls any users that are trying to access the iSCSI target device from another host in the network. This is the case for both Global Users and Target Users.
2. **Outgoing**: Outgoing user and password controls the authenticity of iSCSI target device to the inquiring user. This is to certify to the incoming user that the system that they're trying to access is indeed the system they've intended to access.
   NOTE: This feature is not supported by all iSCSI initiators available. Please refer to your iSCSI initiator manual for details.
3. Incoming and Outgoing user applies to both Global User and Target User.
   NOTE: Only 1 user ID and password is used for Outgoing user.

Global User:

1. Input user name
1. Input password
2. Confirm the password
3. Click on Add. This will create the user and add the user to the **User List**
4. Same steps are used for both Incoming and Outgoing Users

Target User:

1. Select the desired LV from the **Select Logical Volume** drop down bar
2. Input user name
3. Input password
4. Confirm password
5. Click on Add. This will create the user and add the user to the **User List**
6. Same steps are used for both Incoming and Outgoing Users

NOTE:

- Length of the password and character requirements depend on iSCSI Initiator used. Refer to your iSCSI Initiator manual for details.
- User list for iSCSI target devices, both Global and Target, is separate from the User list that belongs to Local, NIS or, ADS.

To Delete User:

For both Global and Target, Incoming and Outgoing, users, select the desired user from the **User List** and select **Delete**.

Host IP Blocking:

In addition to user ID and password access control, you can specify host IP of the client for access control. To add or delete an IP address, follow the steps below:

Adding an IP Address

1. Enter IP address of the host in the **Enter IP address** field.
2. Click on **Allow** to allow host access or **Deny** to deny host access to MN4L+ NSS system
3. Click on **Add**.

Deleting an IP Address

4. Select the IP address from the **IP Address** drop down list.
5. Click on **Delete**.

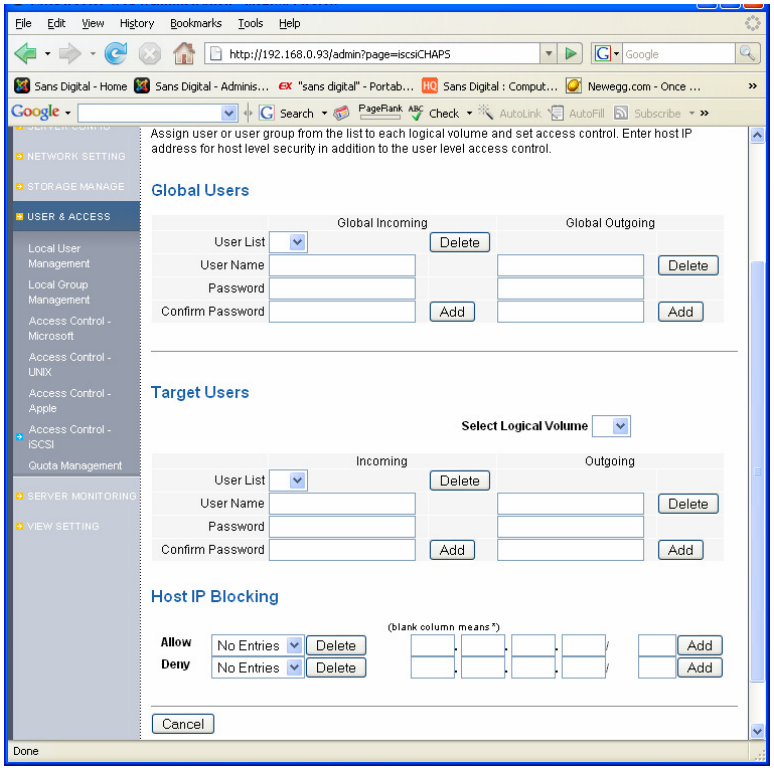
To exit and return to the home page, click on **Cancel**.

NOTE: When IP address is added to the Allow list, those on the Allow list are the only host IP addresses that will be allowed to the target. When IP address is added to the Deny list, those on the Deny list are the only host IP addresses that will be denied to access the target.

QUICK NOTE:

To add some kind of security check for MS iSCSI initiator, must use 12-16 character long password for incoming, and use iSCSI target IQN as outgoing user name and 12-16 character long password.

You can enter target's outgoing password in MS iSCSI initiator's "General->Secret" page.



User & Access - Quota Management

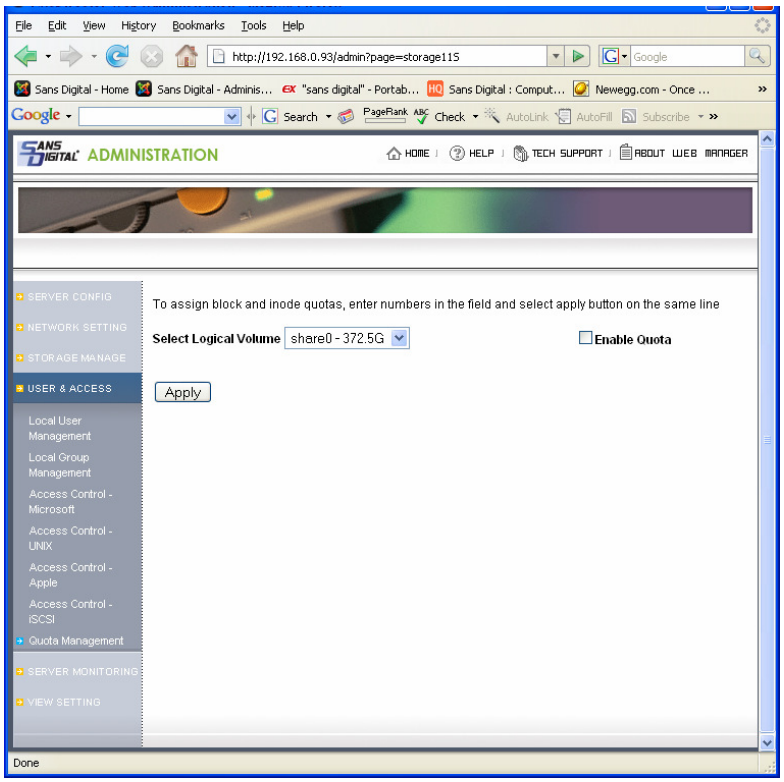
Quota management allows the administrator to apply limitation on capacity and number of files used by each user.

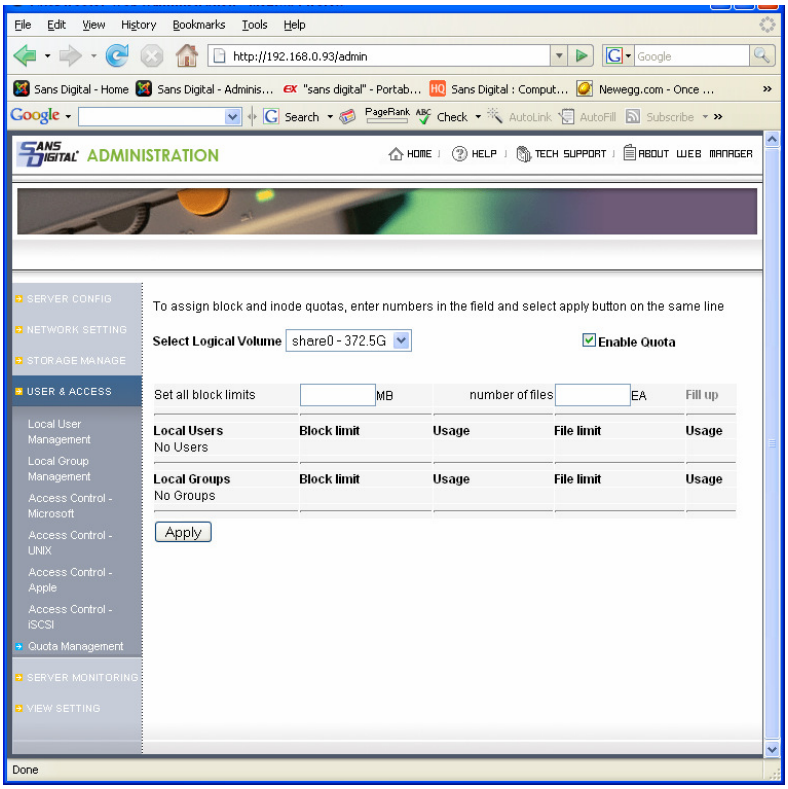
1. Select logical volume that you wish to apply quota from **Select Logical Volume**.
2. Check the **Enable Quota** box and select **Apply**.
3. Enter block limit per user. This controls the capacity.
4. Enter file limit per user. This controls the number of files.
5. Select Apply button.

NOTE:

- Usage field next to block limit and file limit shows the current usage by the user.
- Quota scheme is designed to monitor aggregate usage of all the users/groups. As a result, sum of quota assigned for the logical volume may exceed the total capacity of the logical volume.
- Quota is not active if the logical volume has "Everybody Access" assigned for Access Control.
- Deleting logical volume when quota is assigned will erase all quota assignment. To reset quota, deactivate and reactivate quota for desired logical volume.

CAUTION: When using with SFM configuration, enable quota before enabling SFM. If SFM requires disabling, disable quota before disabling SFM.




File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin
ADMINISTRATION
HOME | HELP | TECH SUPPORT | ABOUT WEB MANAGER
SERVER CONFIG
NETWORK SETTING
STORAGE MANAGE
USER & ACCESS
Local User Management
Local Group Management
Access Control - Microsoft
Access Control - UNIX
Access Control - Apple
Access Control - iSCSI
Quota Management
SERVER MONITORING
VIEW SETTING
To assign block and inode quotas, enter numbers in the field and select apply button on the same line
Select Logical Volume share0 - 372.5G
Enable Quota
Set all block limits MB number of files EA Fill up
Local Users Block limit Usage File limit Usage
No Users
Local Groups Block limit Usage File limit Usage
No Groups
Apply
Done

Server Monitoring - Notification

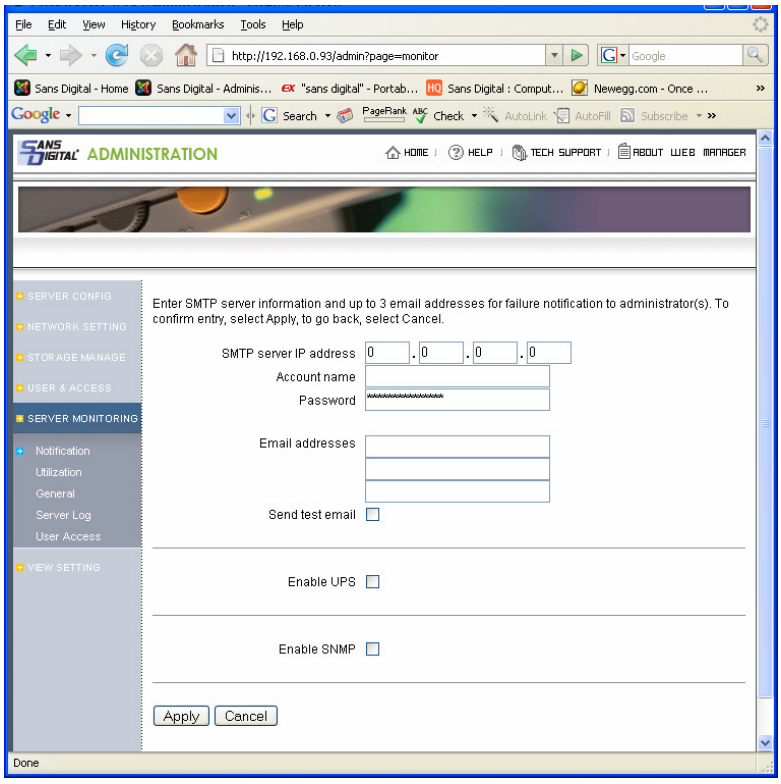
MN4L+ is equipped with features that will notify designated administrators with failure notifications via e-mail.

To setup failure notifications, enter the following:

- **SMTP Server IP Address** - Enter the outgoing e-mail server IP address.
- **E-mail Addresses** - Enter the full e-mail addresses (e.g. bobjones@company.com) of up to three administrators who are to be notified when any of the above selected failures occur.
- **Send Test E-mail** - E-mail a test notification message to each address entered under **E-mail Addresses** above to ensure notifications are received properly.
- **Enable UPS** – COM2 port of MN4L+ may be connected to a UPS's monitoring port. In the event UPS is activated due to power loss, MN4L+ will email the administrator(s) every minute until it is automatically shutdown in 5 minutes. **For proper function, Simple Signaling cable must be used.**
- **SNMP** – When enabled, monitoring applications may receive MN4L+ status via. SNMP protocol.
- **Temperature/Fan Monitoring** – Temperature, CPU/Chassis fans may be monitored via. web administration. In addition, any over-temp or fan failure status will be notified by email.
- **RAID** – PCI based RAID controller pass its array status to the event log, and will also trigger the email notification in case a disk fails.

CAUTION: By default, temperature and fan monitoring are disabled. This is to prevent automatic system shutdown when unknown motherboard is configured. MN4L+ OS must be able to communicate with the server monitoring chips (often referred to LM or I2C sensors) in order to properly use this feature. Any unrecognized chips will result in self-shutdown and require special boot-up process for proper OS boot.

To apply changes, click on **Apply** at the bottom of the screen. To undo changes, click on **Cancel**.



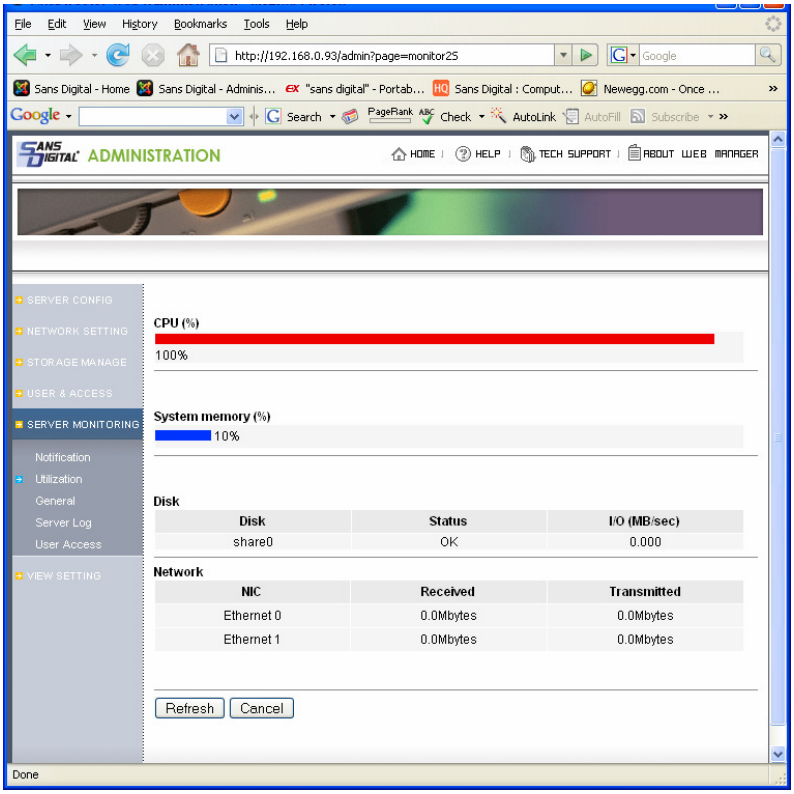
Server Monitoring - Utilization

Monitor the following MN4L+ utilization parameters in real time.

- **CPU** - Displays % of CPU utilization
- **System Memory** - Displays % of system memory being used, includes cached data
- **Disk I/O Utilization** - Displays disk I/O in MB.
- **Network Utilization** - Displays accumulated received and transmitted to and from MN4L+

To view the latest status, click on **Refresh**. To exit and return to the home page, click on **Close**.

NOTE: Utilization page refreshes every 30 seconds.



Server Monitoring - General

Monitor the following areas real time.

- **Server Uptime** – displays how long MN4L+ has been running in days, hours and minutes since it was turned on
- **Server Temperature** – displays the current temperature and fan status of MN4L+.

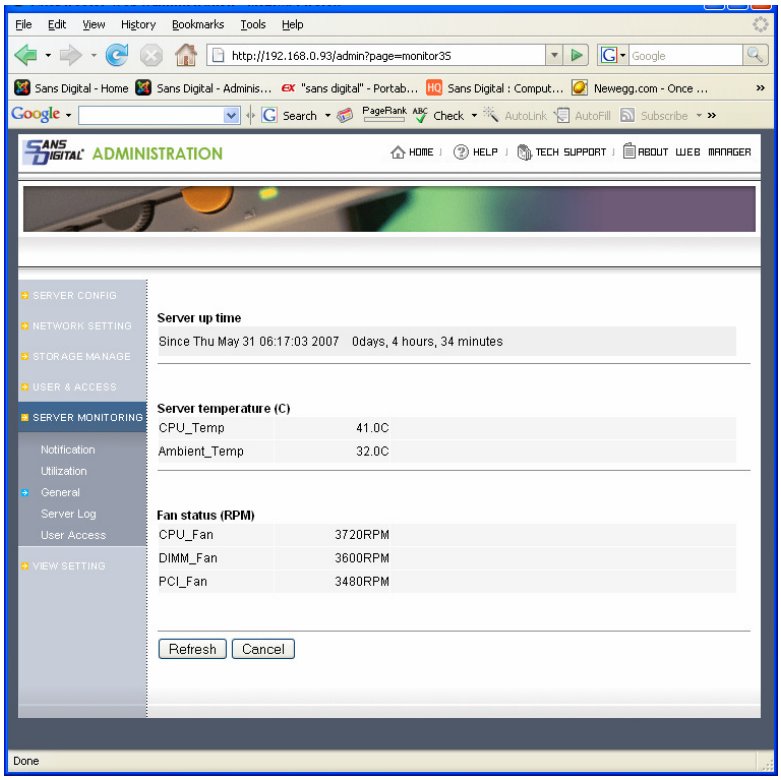
NOTE: If the temperature reaches above 75°C, "Over-temp" is displayed and an e-mail notification is sent to the addresses listed on the **Notification** page.

- **Fan Status (RPM)** – displays rotation speed and status of the (CPU fan and chassis fan) fans: xxx RPM.
- **UPS** – displays whether UPS is connected to the MN4L+.

NOTE: UPS connects to MN4L+ COM2 port. **Use Simple Signal cable.**

- **SNMP** – Displays "Enabled" if activated.

To view the latest settings, click on **Refresh**. To exit and return to the home page, click on **Close** at the bottom of the screen.



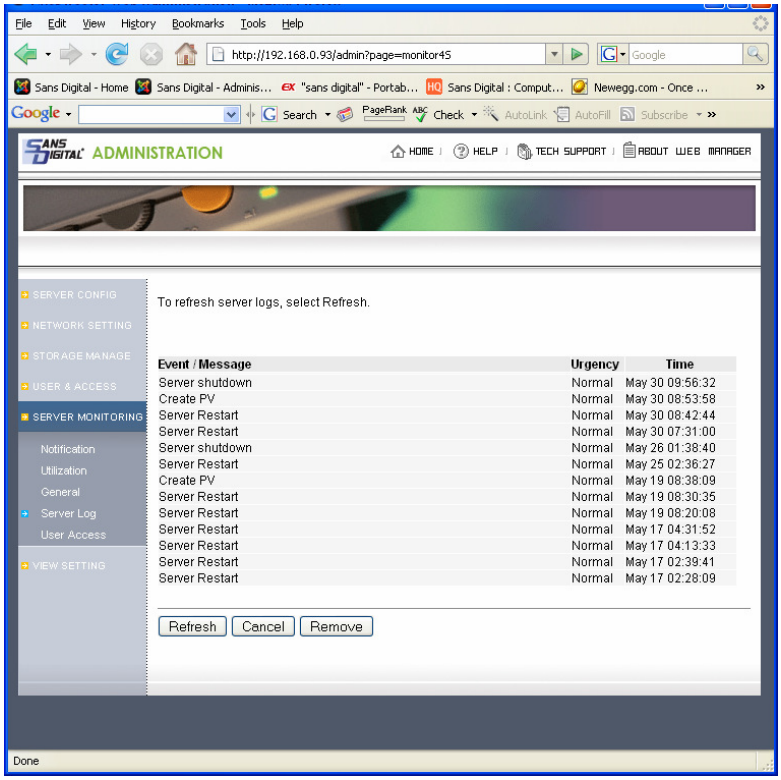
Server Monitoring - Server Log

All MN4L+ activities, events and messages are recorded and displayed on the Server Log page. This is helpful when troubleshooting problems or when a comprehensive log of activities is necessary to manage the MN4L+ system.

- MN4L+ begins recording all server events and activities in the server log as soon as it is installed.
- To view the log of activities for the last X (e.g. 30) number of days, enter X in the data entry field and click on **Refresh**.

Server log on this page is filtered to report those that were determined to be most commonly used. For expanded log, login via. command line. All directories in **/var/log/** can be viewed for various types of system log.

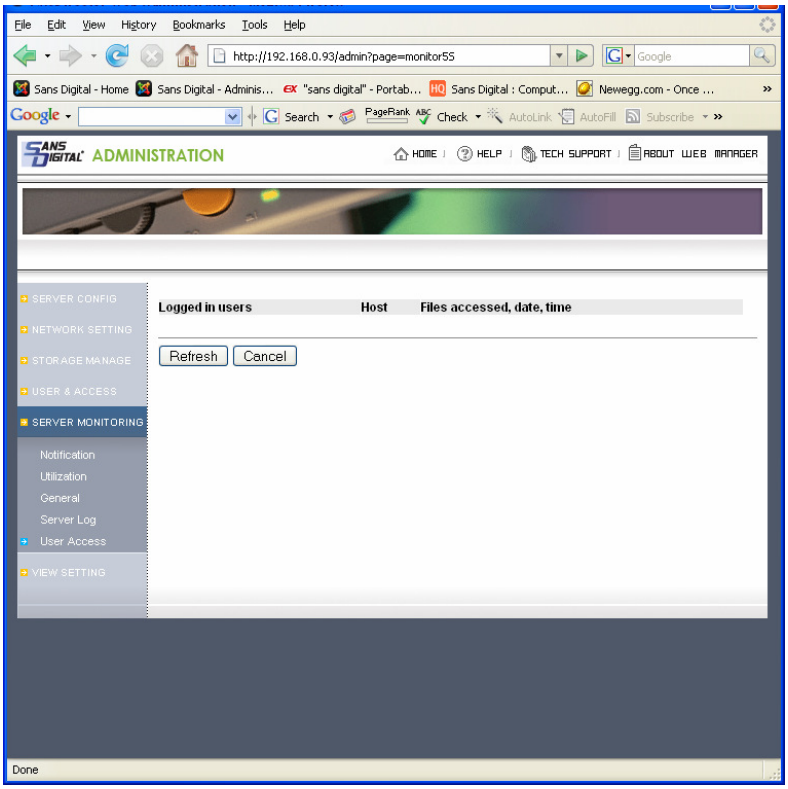
To exit and return to the home page, click on **Close** at the bottom of the screen.



Server Monitoring - User Access

You can view how many users are logged-in to this MN4L+ system as well as details for each logged-in user such as computer used to log in and files that are opened by the user.

To view the latest list of logged-in users and files open, click on **Refresh**. To exit and return to the home page, click on **Close** at the bottom of the screen.



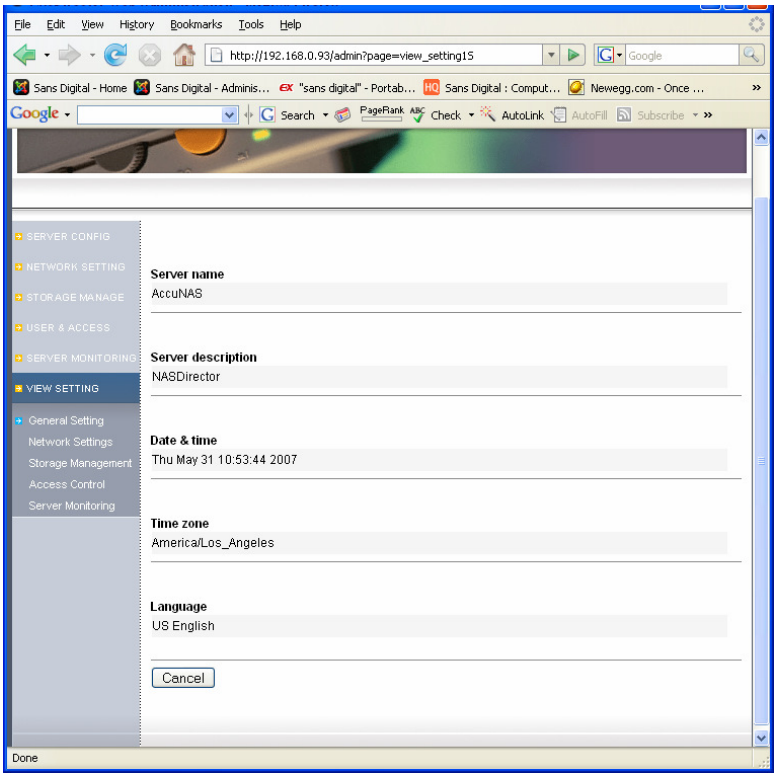
View Settings - General Settings

View the **Server Configuration** settings for the following:

- Server Name
- Server Description
- Date and Time
- Time Zone
- Language
- NTP

These settings are configured and can be changed on the **Server Configuration** pages of MN4L+ Administration.

Click on **Cancel** to go back to the home page.



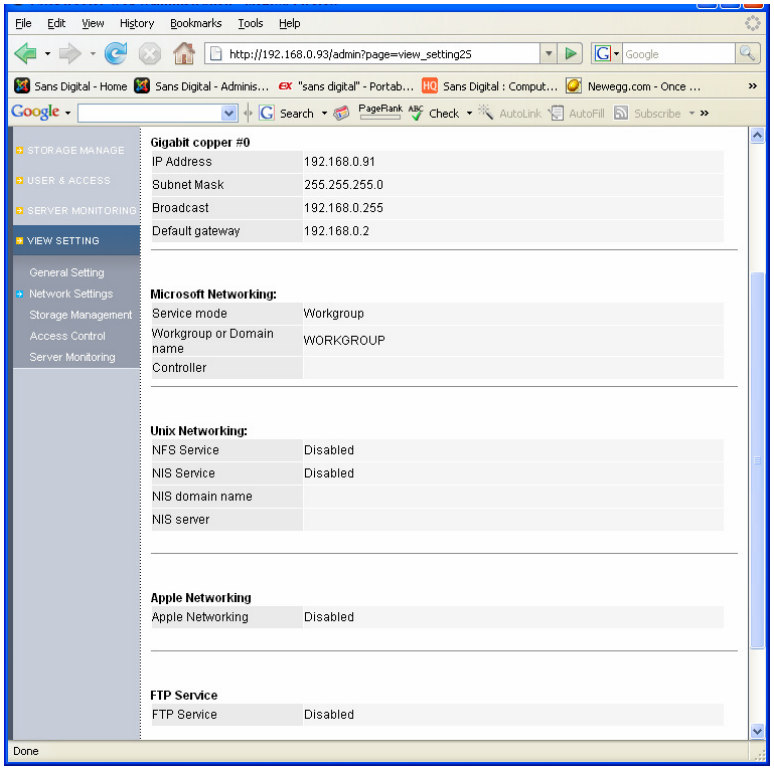
View Settings - Network Settings

View the **Network Setting** configurations for the following:

- TCP/IP settings for NICs
- Port Bonding
- Microsoft Networking
- UNIX Networking
- Apple Networking
- LDAP Client
- DHCP Service
- FTP Service
- iSCSI Initiator Service

These settings are configured and can be changed on the **Network Setting** pages of MN4L+ Administration.

Click on **Cancel** to exit and return to the home page.



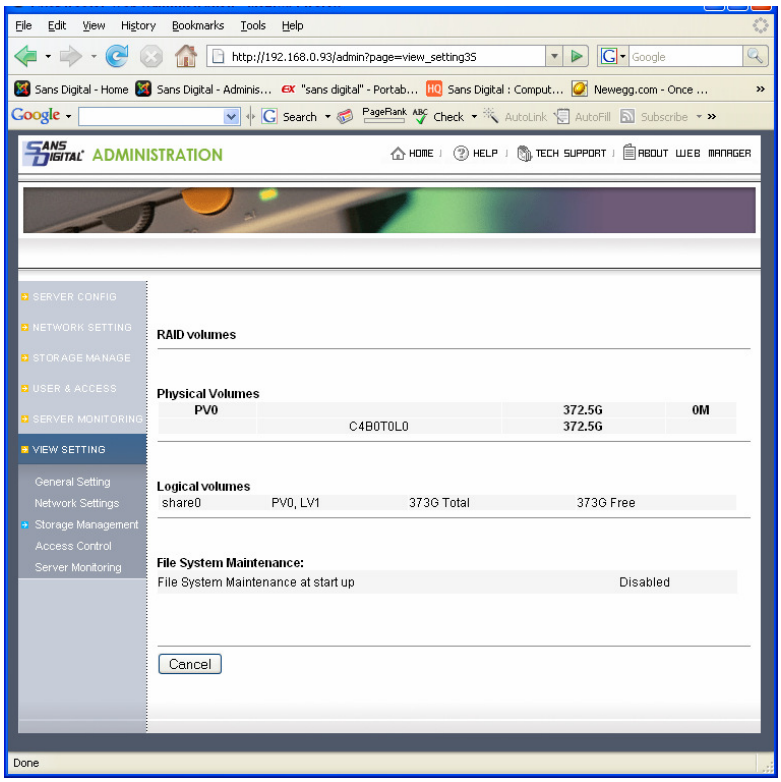
View Settings - Storage Management

View the **Storage Management** configurations for the following:

- RAID Volumes
- Physical Volumes
- Logical Volume Shares

These settings are configured and can be changed on the **Storage Management** pages of MN4L+ Administration.

Click on **Cancel** to exit and return to the home page.



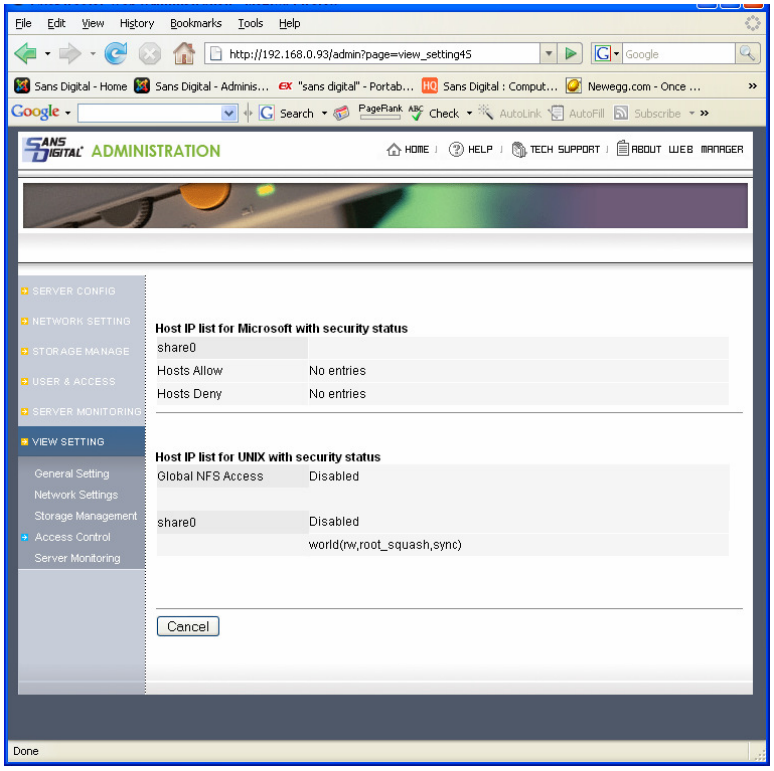
View Settings – User & Access

View the **User & Access** configurations for the following:

- IP address list of all Microsoft hosts with security status
- IP address list of all UNIX hosts with security status

These settings are configured and can be changed on the **User & Access** pages of MN4L+ Administration.

Click on **Cancel** to exit and return to the home page.



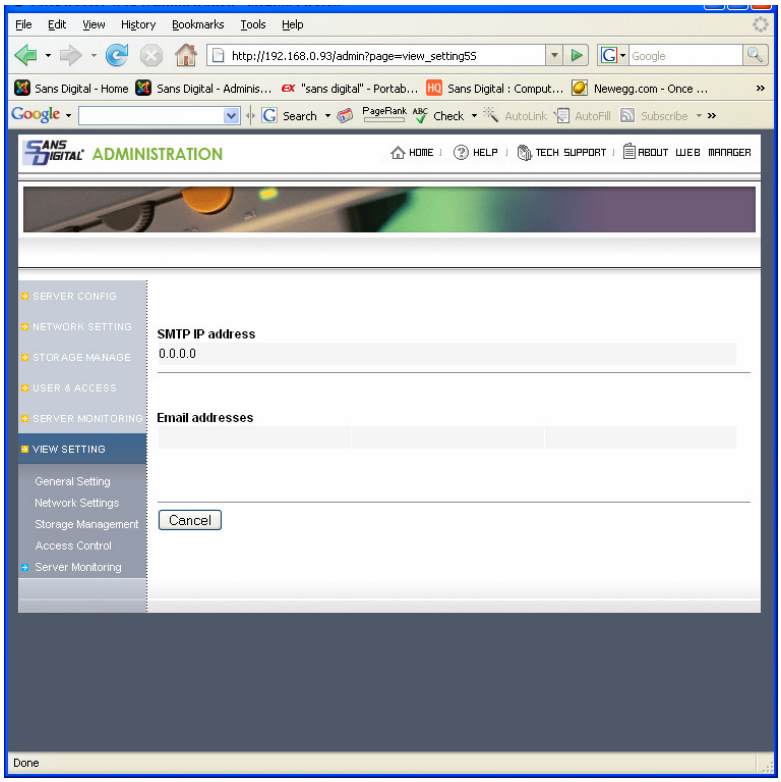
View Settings - Server Monitoring

View the **Server Monitoring** configurations for the following:

- SMTP IP address
- Email Addresses (up to three notification email addresses)

These settings are configured and can be changed on the **Server Monitoring - Notification** page of MN4L+ Administration.

Click on **Cancel** to exit and return to the home page.



Snapshot and Restore

MN4L+ is equipped with Snapshot technology where it can take scheduled "snap shot" of its Logical Volume(s) to retrieve files that were accidentally erased or corrupted. Total number of Snapshots per MN4L+ system is 32, regardless of number of PV's or LV's existing on the system.

32 snapshot volumes limit was placed as it is the typical maximum used by users. The quantity of Snapshot volumes may be increased if necessary, please contact Sans Digital for details.

NOTE:

- Snapshots are assigned to individual Logical Volumes, and Snapshot itself is a volume, thus Snapshot (snapshot volume) inherits original volume's access control, which means, if a user can access the original volume, then he/she can access the snapshot volume for that original volume without special setup.
- Logical Volumes and Snapshot Volumes reside in the same Physical Volume. As a result, Physical Volume must have adequate free space to support Snapshot Volume.
  Size of LVs + Size of Snapshots = or < Size of PV
- Size of the Snapshot Volume varies depending on the environment which MN4L+ is deployed. If there are frequent changes to the files by large number of users, and multiple Snapshots are required per Logical Volume, then, higher capacity should be considered for Snapshot Volume.
- MN4L+ uses block level method, where changes in the Logical Volume are written to the Snapshot Volume(s) simultaneously. As a result, multiple Snapshot Volumes per Logical Volume requires multiple writes. Performance degradation for disk I/O is affected by number of Snapshot Volumes per Logical Volume and frequency of changes in the Logical Volume.
- In the case of Snapshot Volume getting maxed out on capacity, no more snapshot will be taken, until the administrator removes some old snapshots.
- If a volume has snapshot(s) associated with it, before you can delete the volume, you must first delete the associated snapshots.

To Create Snapshot:

1. Input name in the **Snapshot share name**. Up to 15 alpha numeric characters
2. Select the LV from the **Volume List**. Adequate free space must exist in the PV that selected LV resides
3. Input description in the **Snapshot description** field. This is optional
4. Input capacity of the Snapshot Volume in the **Snapshot size** field in MB
   a. **Time based** is specified time that each Snapshot is taken. For example, hour of the day, day of the week, or date of the month.
5. For Time based schedule, select the frequency – Day, Week and Month:

   Frequency: -- **Day** → Daily, then pick the Time of the day below.
   -- **Week** → Weekly, then pick the Day of the Week and Time of the Day below.
   -- **Month** → Monthly, then pick the Day of the Month, and the Time of the Day below.
   a. **Day**: Input hour and minute of the day to take Snapshot. Value of 1 is 1:00AM, 2 is 2:00AM, … 14 is 2:00PM, and so on…
   b. **Week**: Input day of the week, then hour and minute of the day to take Snapshot. Value 1 is Monday, 2 is Tuesday, … Value 7 is Sunday, and so on…
   c. **Month**: Input date of the month, then hour and minute of the day to take Snapshot. Value of 1 is 1st, 2 is 2nd, and so on…
6. Select **Create** to create Snapshot Volume

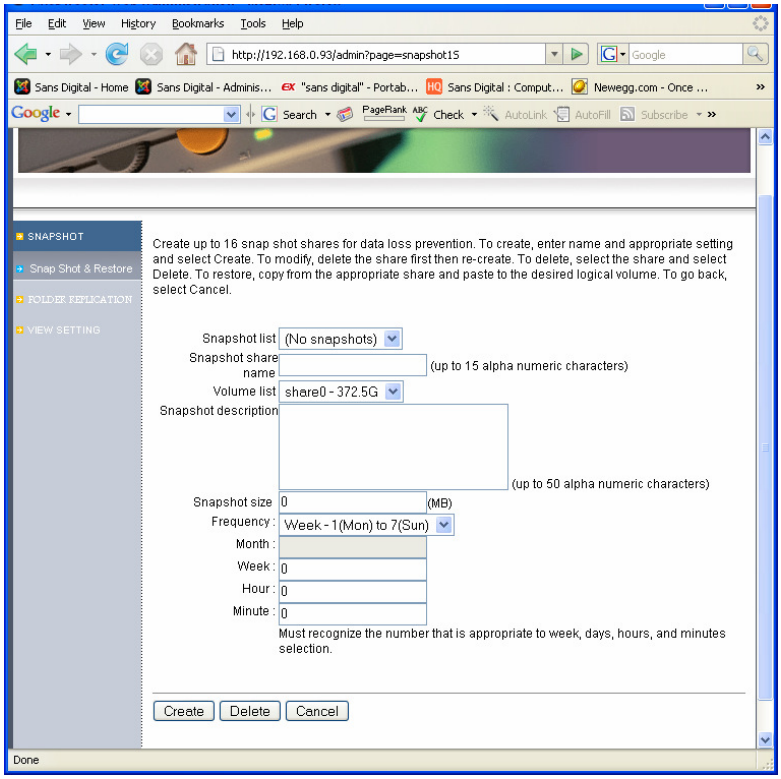
Note: To create multiple Snapshots on a same data volume, following is a sample for it:
Select data volume –vol1 from the dropdown list
Enter snapshot volume name as: spv1
Frequency: Day (Daily)
Day: 9 (9:00AM)
Create – this creates a snapshot volume spv1 every day at 9:00AM for volume vol1

Select data volume –vol1 from the dropdown list
Enter snapshot volume name as: spv2
Frequency: Day (Daily)
Day: 14 (2:00PM)
Create – this creates another snapshot volume spv2 every day at 2:00PM for the same volume vol1

To Delete or Modify Snapshot:

1. Select desired Snapshot from the **Snapshot list**. If you cannot locate the Snapshot Volume, change to another LV by selecting a different LV from **Volume list** drop down box
2. Select **Delete** to delete the Snapshot Volume
3. To modify, first delete the Snapshot and recreate

Click on **Cancel** to undo changes and return to home page.


File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=snapshot15
SNAPSHOT
Snap Shot & Restore
FOLDER REPLICATION
VIEW SETTING
Create up to 16 snap shot shares for data loss prevention. To create, enter name and appropriate setting and select Create. To modify, delete the share first then re-create. To delete, select the share and select Delete. To restore, copy from the appropriate share and paste to the desired logical volume. To go back, select Cancel.
Snapshot list (No snapshots)
Snapshot share name
(up to 15 alpha numeric characters)
Volume list share0 - 372.5G
Snapshot description
(up to 50 alpha numeric characters)
Snapshot size 0 (MB)
Frequency : Week - 1(Mon) to 7(Sun)
Month :
Week : 0
Hour : 0
Minute : 0
Must recognize the number that is appropriate to week, days, hours, and minutes selection.
Create Delete Cancel
Done

Backup Software Agent Install

There is no pre-installed Tape Backup program within MN4L+. Instead, RPM package manager was included in the MN4L+ OS. As a result, users can now install backup agents from various backup software(s) – licensed or freeware – available in the market. Some of the backup software(s) supported by MN4L+ are listed below. In most cases, even if a 3rd party backup software is not listed, but still there is a good chance that MN4L+ can be configured to support it. Please contact Sans Digital for updates or consultation to add your software to the list.

1. Veritas Backup Exec
2. Veritas Net Backup
3. Amanda
4. BRU Backup Software
5. Legato Networker

Server Fail-over & Mirror

(Additional License may required)

Server Fail-over and Mirror (SFM) is used to bind two MN4L+ NAS units as one over LAN, so as to write data to both systems simultaneously. In addition, this feature also provides NAS/service fail-over so that network clients can be serviced by the secondary NAS in the event that primary NAS fails. The clients accessing the primary NAS, in most cases, will not notice the fail-over process when the secondary MN4L+ takes over.

Each MN4L+ system has two groups of network port(s). One group is dedicated for client serving (Data ports) and the other group is dedicated for data copying and communicating (SFM ports) with each other. Both groups of network ports may be bonded for higher throughput as well as fail-over within NIC ports.

CAUTION: SFM is intended to be used for NAS units within the same local LAN, and not for over the WAN/VPN/Internet.

Before configuring SFM:

- Both systems should have at least one NIC port dedicated for SFM use. Connection between two systems may be via. cross over cable, or, on a switch. When using the switch, it is recommended that the switch for SFM ports be separate from Data ports. **Note**: SFM port may be configured simply by clicking on the available port and selecting SFM. TCP/IP information is not needed for SFM port.
- **Both systems must have same number of PV's and LV's as well as same capacity for PV's and LV's. Name the PV's and LV's the same for both systems**.
- Both systems should be connected to the same subnet.
- If ADS/PDC and/or NIS synchronization is planned, synchronize ADS/PDC and/or NIS before starting SFM configuration for the **primary server**. If ADS/PDC and/or NIS synchronization need to be disabled, disable SFM first.
- Plan 3 IP addresses:
    1. Data IP address for primary NAS. For example, 10.1.1.100
    2. Data IP address for secondary NAS. For example, 10.1.1.101
    3. IP address for Virtual Service port. Virtual Service port is used for clients to connect to MN4L+ in SFM mode. For example, 10.1.1.200
    4. For this manual, following IP addresses will be used for example:
        - Primary NAS IP address: 10.1.1.100
        - Secondary NAS IP address: 10.1.1.101
        - Service(virtual) port IP address: 10.1.1.200

To Configure SFM:

1. Power up **primary NAS**. Secondary NAS must be turned off.
2. Configure the TCPI/IP for Data port and SFM port in Network Setting / TCP/IP configuration. IP address for primary server's Data port would be (10.1.1.100). SFM port is auto-assigned by MN4L+, simply click on the available NIC port, SFM radio button and **Apply**
3. Go to SFM page found in **Backup, Mirror and Restore** section, and select Primary radio button. Input **Service(virtual) IP address**, (10.1.1.200) and **Secondary NAS Data port IP address**, (10.1.1.101)
4. Reboot the primary server. Configuring **primary NAS** is done
5. Power up **secondary NAS**. Primary NAS should be on at this time
6. Configure the TCP/IP for Data port and SFM port in Network Setting / TCP/IP configuration. IP address for secondary server's Data port would be (10.1.1.101). SFM port is auto-assigned by MN4L+, simply click on the available NIC port, SFM radio button and **Apply**
7. Go to SFM page found in **Backup, Mirror and Restore** section, and select Secondary radio button. Input **Service IP address**, (10.1.1.200) and **Primary NAS data port IP address**, (10.1.1.100)
8. Reboot the secondary NAS.
9. Both systems' SFM page will indicate that sync. is configured.
10. Clients need to map to the network storage available from 10.1.1.200 (virtual service port ip)
11. If the primary server should fail due to:
    a. Disconnected NIC port
    b. Power outage
    c. RAID volume corruption
    d. OS kernel panic
12. Secondary server will take over the service and all data on the primary server will be available.

To Re-Deploy failed Primary NAS:

1. Fix the problem that disabled the primary NAS. **Note**: The re-deployment of the primary NAS is so that it can become the secondary NAS. Former secondary NAS is now the primary NAS
    a. MN4L+ server to be re-deployed must meet the requirement detailed under **Before configuring SFM**.
    b. Configure TCP/IP for the Data port. In line with above example, Data port IP address would be (10.1.1.100)
    c. Follow steps above to configure the NAS to synchronize with **primary NAS (formerly secondary NAS)**
    d. Boot the former primary NAS, it will sync and take position of secondary NAS

NOTE:

- If primary NAS had data stored before configuring SFM, it will immediately start to copy its data to the secondary NAS right after configuring SFM. Depending on the size and type of file(s) on the primary NAS, copy process time will vary.
- When the former primary NAS (now secondary server) is re-deployed, data copy from former secondary NAS (now primary NAS) to former primary NAS (now secondary NAS) will take place immediately.
- Since NAS-to-NAS data mirroring involves multiple writes of same data, overall throughput of the MN4L+ will be reduced. Performance varies on usage, type of data being transmitted, and workload that Mn4L+ is subjected to. Anyway, it is a trade-off between performance or redundancy.

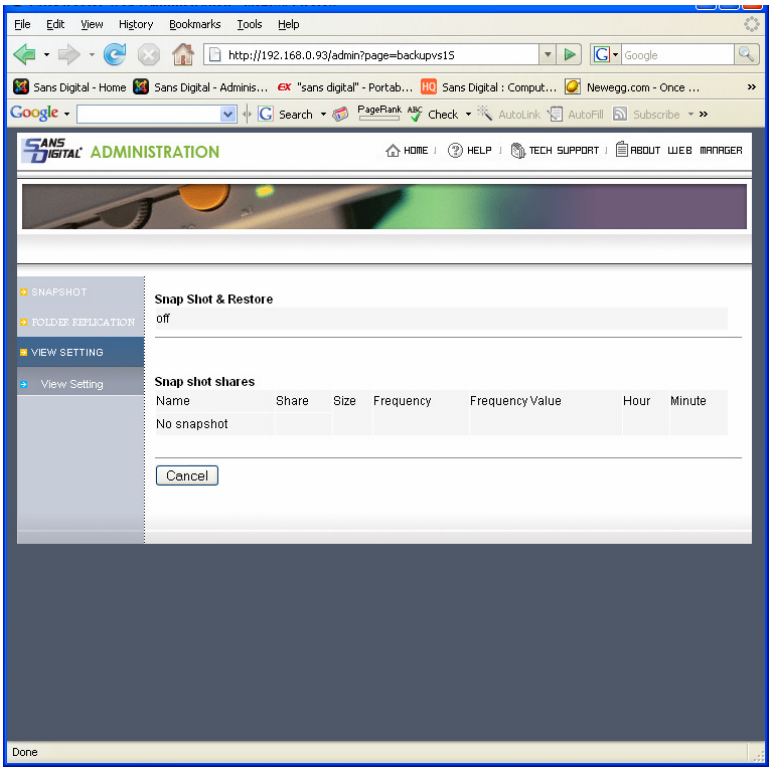
View Settings - Snap Shot & Restore

View the **Snap Shot & Restore** configurations for the following:

- **Snap Shot & Restore** - indicates whether the feature is on or off
- **Snap Shot Volumes** - displays all snap shot volumes available for snap shot and restore

These settings are configured and can be changed on the **Snap Shot & Restore** page of MN4L+ Administration.

Click on **Cancel** to go back to the home page.



View Settings - Sever Fail-over & Mirror

View the **Server Fail-over & Mirror** configurations for the following:

- **Server Fail-over & Mirror** - displays whether this feature is turned on or off.
- **Service IP Address** - displays the virtual IP address that will be used by both servers to service its clients.
- **Primary server IP address** - displays the private data port IP address of the primary NAS.
- **Secondary server IP address** - displays the private data port IP address of the secondary NAS.

These settings are configured and can be changed on the **Server Fail-over & Mirror** page of MN4L+ Administration.

Click on **Cancel** to exit and return to the home page.

MN4L+ UPDATE

To update/patch MN4L+ to the latest OS version:

- First copy the patch file from local computer to one of the directories on the NAS
- Login to the web administration of MN4L+, go to **Update** section.
- Click on **Directory Browse** and locate the patch file.
- Click on the patch file and it will be displayed in the Directory Browse window.
- Click on **Update**.
- When prompted, click on **Reboot** for MN4L+.

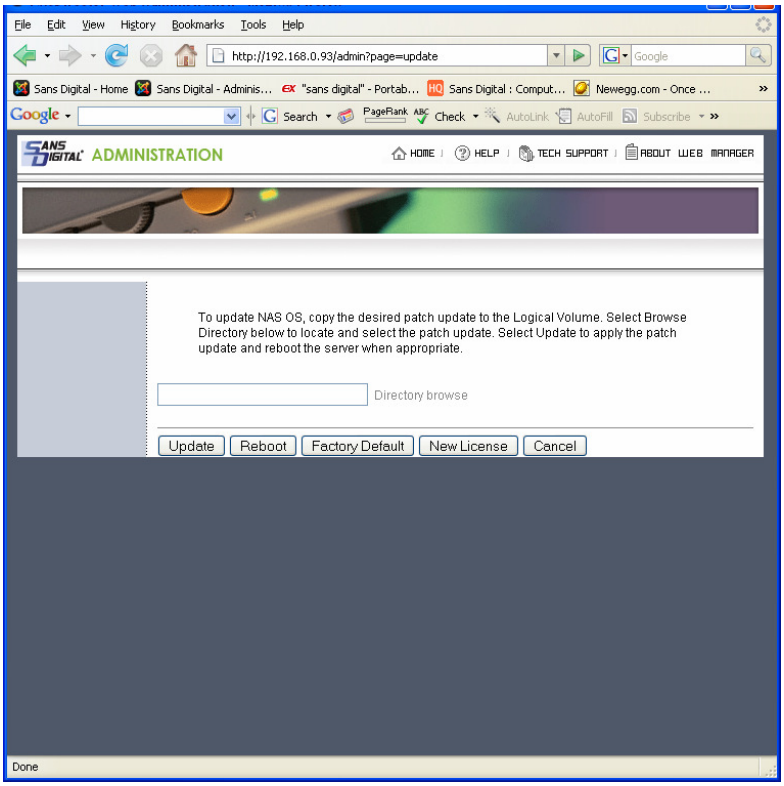
NOTE: Reboot will end services to any attached clients. Reboot only when appropriate.

CAUTION: We do not provide any warranty of data loss due to patch updates. It is recommended that users backup important data before updating patches for the OS.

To reset the server setting to factory default:

Select **Factory Default** button. **CAUTION**: Selecting this option will reset all settings, including deleting logical volumes (that will erase all data), users… Confirmation window will re-confirm your decision.

Select **Cancel** to return to the Home Page.


File Edit View History Bookmarks Tools Help
http://192.168.0.93/admin?page=update
ADMINISTRATION
HOME | HELP | TECH SUPPORT | ABOUT WEB MANAGER
To update NAS OS, copy the desired patch update to the Logical Volume. Select Browse Directory below to locate and select the patch update. Select Update to apply the patch update and reboot the server when appropriate.
Directory browse
Update
Reboot
Factory Default
New License
Cancel
Done

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